THE

Practical Teacher

A MONTHLY EDUCATIONAL JOURNAL

Edited by JOSEPH HUGHES.

'*Knowledge is proud that he has learned so much,*
Wisdom is humble that he knows no more.'—COWPER.

VOL. V. No. 12. FEBRUARY, 1886. { PRICE 6D. POST FREE, 7½D.

Hygiene.

BY ALFRED CARPENTER, M.D., M.R.C.P. (LOND.), C.S.S., CAMB.

Prevention (*continued*). — *Intermittent Fevers* or agues, as they are commonly called, are to be prevented by a systematic drainage of the infected district. Malarious fevers (marsh fevers) belong to the same class, and can only be eradicated by the removal of stagnant water (which is usually contaminated by decomposing vegetable matter), and by supplying pure water for drinking purposes. The diseases above named were much more common in former times in all parts of Great Britain, except on the hills. The better cultivation of the soil and attention to the water supply for the use of the people have altered this state of things, and these diseases are now as rare as they were formerly frequent, except in the marshes. Dysentery is closely allied to this class, and one kind is probably promoted by the imbibition of some forms of diatom in the drinking water, which irritates the rectum, and sets up the bloody discharges with which the disease is associated. The remedy for these diseases is removal from the district, or, if this is not possible, change of water supply, or the water should be boiled and filtered before use.

Typhoid Fever.—When this disease is epidemic, the water supply is at fault. It is probably contaminated with fæcal evacuations, derived from previous cases, or it has been aerated by gases from sewer sources. Isolated cases may be imported, but if there is a continuance of fresh outbreaks, the water supply is certainly at fault. It may be spread abroad by milk contaminated by adulteration with impure water, or by absorbing sewer gases at its place of storage. The method of contamination differs from that which takes effect when scarlatina is spread about by similar means. In the latter case it is probable that the milk has absorbed the germs of the disease directly from some case existing in the house of the milk-seller, or from a person actually suffering from the disease who has been engaged in milking the cows or distributing the milk; a few germs from an actual case may increase and multiply to an enormous extent in new milk. This result accounts for the rapid spread of scarlatina by means of milk supply. The causation being known the means to be taken for the arrest of the disease will be manifest.

Typhus Fever is caused by overcrowding and impure food, whilst *relapsing fever* is connected with the same causes, together with a deficient supply of the latter, the remedies being pure air and good food. Some of these diseases are infectious to a much more serious extent than others; the two latter are especially so, if the air be impure, but in large open wards, or well-ventilated apartments, there is but little danger of infection, if moderate care be taken by those in charge of the cases. In typhoid fever the danger is nothing in any case, except by gross carelessness and dirty habits on the part of the attendants, such as by drinking liquids which have been in the room with the sick person, or eating with unwashed hands after attending to the patient.

Scarlatina is easily conveyed from patient to patient, but is not capable of transmission by aerial means beyond a few feet, the active germs which set up the disease, and which are given off from a patient, not being capable of a separate existence in the open air for an appreciable time. They are in a condition similar to that of blood corpuscles, a very small exposure to air being fatal to their vitality, but the germs which have not begun to alter their form, the resting spore (so to speak), may be conveyed for some distance in the air, or on fomites (dirty clothes, etc.), and so the disease may be spread abroad by that means. The same rules as to prevention apply to small-pox and diphtheria as well as to scarlet fever. It is probable that malignant pustule and erysipelas may also be similar in their developments, though differing in their distribution.

The Prevention of Constitutional Maladies.—It is only in recent years that hygienists have been able to include these diseases as among the preventable class.

Consumption, rheumatic fever, rickets, and some few other forms of disease are capable of removal by proper hygienic measures. It has been clearly proved that dampness of soil promotes a tendency to phthisis. Nearly all those towns in which there has been a lowering of the water line, and a removal of ground water, there has been a marked diminution in the number of

BRITISH MUSEUM

deaths from consumption. Mill dams are notorious causes for dampness of subsoil, and when there is a considerable population living on the subsoil which is affected by the mill dam they are sure to suffer seriously from lung disease; a moist soil is also colder in comparison with a neighbouring drier situation. It will be seen to be liable to fogs, when other land in close proximity, but better drained, is free from them, and decidedly warmer, though only separated by the crest of a low hill, or even upon the same level, but on a better drained and more porous subsoil. Damp districts are not so healthy as those better provided for. Phthisis or wasting lung disease and acute rheumatism are more frequently fatal in such positions. Premature confinements are more frequent, and the general health of the district has a lower average than need be. A system of drainage which shall keep the water at a regular level in the subsoil, at least ten feet below the surface of the ground, is the most beneficial remedy. Wasting lung diseases are to some extent infectious, and are promoted by impure air such as arises in overcrowding. The denser the population the higher the mortality from this class of disease, and if with a dense population there is a cold water-logged subsoil, the diseases are most fatal. Occupation among dusty industries, sedentary occupation in hot as well as in cold damp air, assist in promoting its development, so that drainage alone will not remove its incidence; but there must be removal of all those causes which promote the development of tubercular conditions.

Rickets is a disease which is very common in large towns; it is due to two distinct causes—first, an hereditary taint from strumous or syphilitic parents, and second, improper food, with deficiency of milk supply. Children brought up by hand are most liable to it. There is a diminution of phosphate of lime in the tissues, and as a consequence the bones are soft and misshapen. Unfavourable sanitary conditions promote it, especially the absence of sunlight. It has been said to be more frequent in those towns in which the water supply is free from lime salts, if there is also an absence of milk supply and no fresh vegetables for the poor; rickets is likely to be frequent in the dark, overcrowded, ill-ventilated tenements in which the poor are huddled together. The presence of the disease is a reflection upon the local authority for neglect of duty.

Scurvy is a disease which is likely to arise when there is not a sufficient supply of vegetable food; it may occur on land as well as at sea, and is not infrequent among the destitute poor. It must not be forgotten, as it occasionally appears, especially in seaports, among half-starved sailors. The remedies are fresh vegetables and fruit. The symptoms are blotches or effusions of blood beneath the skin, spongy gums, which easily bleed, and great prostration of strength. Those on the borders of the disease easily bruise and have large ecchymoses from slight causes. The sanitary officer must not forget its possible existence.

Boils and *carbuncles* are sometimes epidemic in a district; they are probably caused by the use of decomposing food or water in which the juices of such have been allowed to mingle, or with the gases from some decomposing animal matter. Wherever they are prevalent it behoves the officer of health to look to the sanitary state of his district with still greater care.

It may be right to define the meaning which attaches to the terms *Epidemic* and *Endemic*, to *Contagion* and *Infection*.

An epidemic disease may be contagious or infectious, and it may be endemic. An epidemic is a disease which prevails exceptionally; the contagious particles upon which it depends, are much more capable of development at some seasons than at others, and as in natural history we have flights of grasshoppers and lady-birds, because the seasons are favourable, so we have flights of cholera spores and small-pox germs from similar reasons. Lady-birds are always more or less present, but it is only in favourable seasons that there are great numbers to be seen. Solitary cases of infectious disease may be likened to the occasional lady-birds; they may be said to be endemic. The Greek words 'Epi' and 'En' indicate that in the former the disease is upon (the people), or general; in the latter, it is among them, but only here and there. It is the endemic cases which allow of the production of epidemics.

The difference between Infection and Contagion is not so decided; the latter term is used to signify the communication of disease by contact, and infection when it may be transmitted by aerial means, but they are really convertible terms and cannot be distinguished sufficiently to be of scientific use.

The term Contagia is made to apply to the germs of infectious disease generally; they are solid living particles, and capable of enormously rapid development. Chemically they are nitrogenous, and in their decomposition become ammoniacal; they mainly reside in the excreta from cases of disease, being thrown off either from lungs, skin, kidneys or bowels. Those from lungs are capable of being transmitted for short distances only through the air, as they are already developing. Those from other organs may be conveyed any distance if preserved from decomposition, which, when putrefactive, quickly destroys them. Hence it is that the action of disinfectants may be such as may preserve contagion, unless there is a completely destructive agency, such as by heat or sulphate of iron.

Nuisances.—A nuisance is anything which worketh hurt, inconvenience, or damage. A nuisance may be *public* or *common*, and which are annoyance to all the Queen's subjects, or it may be *private*, which is anything done to the injury or annoyance of a private individual.

According to the definition of judges learned in the law, to constitute a nuisance, it is enough that the matter complained of renders the enjoyment of life and property uncomfortable. It will be requisite for the reader to study carefully the Public Health Acts, as well as sanitary legislation generally, to get a good insight into the subject of nuisance, which is closely related to sanitary law. These will be found in 'The Law of Public Health and Local Government,' edited by the Brothers Glen, and published by Knight and Co., which, together with the subject as worked out in Blythe's 'Dictionary of Hygiene' and Parkes' 'Practical Hygiene,' edited by Professor de Chaumont, will assist the reader to obtain a perfect knowledge upon the whole case. I would also recommend a careful study of the various authors to whom I have already referred to those who wish to get a deeper insight into Hygiene than it has been possible to give in the pages of THE PRACTICAL TEACHER.

Lastly, as to *Vital Statistics*; I would especially

recommend a careful study of 'The Memorial Volume of Selections from the Reports and Writings of Dr. William Farr,' which has just been published by the Sanitary Institute of Great Britain, and which contains a mass of most valuable information upon a most difficult and intricate subject. If in addition to that volume the reports which have been recently issued by the Registrar-General and the medical officer to the Local Government Board are also carefully scanned, the student will have as good knowledge upon the matter as most men enjoy at present.

In bringing this series of hygienic observations to a conclusion, the writer is conscious of many deficiencies. It will also be necessary to refer back to the sections which deal with corresponding subjects on School Hygiene, and which were published in the first volume of The Practical Teacher, to elucidate more clearly some of the points only touched upon in the present series.

Popular Mythology.

BY THE REV. SIR GEORGE W. COX, BART., M.A.,
Author of 'Tales of Ancient Greece,' 'Mythology of the Aryan Nations,' etc.

[These papers are designed for our youngest readers. Used as themes for composition work, they will be found invaluable.]

IV.

Alcmæon, Alkmaion [Amphiaraos].

Alcmene, Alkmene [Herakles].

Allecto, Allekto [Eumenides].

Aloadai are, in Greek mythology, strictly crushers or pounders. The name is commonly given to the giants Otos and Ephialtes (the *pusher* and the *leaper*), sons of Poseidon. They are said to have put Ares, the cloud-god, in chains, and to have kept him a prisoner for more than a year. But, apart from their exploits of piling mountains on mountains, little in the form of a tale is related about them, except in reference to their death, which is brought about by Artemis. In the form of a stag, the goddess runs in between the two brothers, who, both aiming at and missing her, kill each other.

In the German version of Hamlet, the prince brings about the death of two men who wish to murder him by a precisely similar device. He prays them to give him a few minutes for prayer, and bids them after this to aim each a pistol at his two sides, promising to give them the signal for firing. When he does this he falls forward, and the ruffians shoot each other.

But the name of the Aloadai is more important than the incidents of their deeds. It is connected with the word Alôê, a threshing-floor; and the word for *ground corn*, Aleuron, is also found under the form Maleuron. The Greek Alôê is thus connected with Mulê, in Latin Mola, our *mill*, which gives us *meal*, all these words, with very many more, containing the root *mar*, or *mal*, which denotes crushing and grinding. When, then, we hear in Greek stories of another set of giants called Molionids, or children of Molion, the *miller*, we see at once that we are only dealing with the Aloadai under another name; and, seeing this, we are able to trace these crushers and grinders in the popular stories of every country. In India they are the Maruts, the winds who crush and destroy the forests in their rage; in Roman tradition we find the name in the god Mars, who answers to the Teutonic Thor Miölnir, who smites down his foes, and grinds them to powder beneath his mighty hammer.

Alpheios [Arethusa].

Alrune, in the Teutonic mythology, is a wise woman, who answers to the Greek Athênê and the Latin Minerva. Tacitus gives her name in the Latinised form Aurinia.

Althaia, Althæa [Meleagros].

Amaltheia, in Greek mythology, is sometimes spoken of as a nymph, and a daughter of Helios, the *sun*; but more commonly as a goat, with whose milk the infant Zeus was fed in the cave of Diktê. The horn of this goat became the Cornucopiæ, or horn of plenty; in other words, one of that vast multitude of vessels which have the power of endless reproduction, like the table of the Ethiopians, the round table of Guenevere and Arthur, the Sangreal, the luck of Edenhall, the caldron of Ceridwen, etc.

Amazons.—Of these mysterious beings many stories, not altogether consistent, are told. It is said that they came from the banks of the river Thermôdôn; but this stream of warm water is no more to be identified with the river of that name which flowed near Trapezous (Trebizond) than the golden streams of Xanthos are to be sought in the regions of the Asiatic Lykia (Lycia). These places, like Delos, Arkadia, Lykosoura, Ortygia, and many more, belong to the domains of mythical geography; and the attempt to connect them with historical maps has been conclusively shown by Colonel Bunbury (*History of Geography*) to be impracticable, and, indeed, absurd. According to the myths, the legions of the Amazons are to be found everywhere. They are warriors whom it taxes the full strength of their enemies to withstand; but they are all women, whose right breast has been cut off, to enable them to act the more effectually as archers. They are also beautiful, and the ideal of their beauty found its perfect expression in the sculptures of the Parthenon, under the hand of Pheidias himself. (Perry, *Greek and Roman Sculpture.*) In the Trojan war they appear as the defenders of Ilion: and Ilion is the stronghold of the dark robber and deceiver Paris. They are also the enemies of the Lykians, or the men who dwell in Lykia (Lycia), the land of *light*, and, as such, are smitten by Bellerophon, with whose exploits we shall have to deal later on. In the streets of Athens, the home of the Dawn or Light goddess Athênê, they fight with Theseus and his warriors, and are beaten. One story relates that the Amazonian leader, Antiope, being taken prisoner by Herakles, became the wife of Theseus and the mother of Hippolytos; but other versions make Hippolytos a son of Hippolyte, which yet may be only an epithet of Antiope.

In their general characteristics the Amazons may be compared with the Kentaurs, or Centaurs; and the latter, there can be little doubt, bear the name of the Hindu Gandharvas, inhabitants, like the Phaiakians (Phæacians) of cloud-land. Clouds may be either bright or dark, beautiful or lowering; and in their dark aspect, they are enemies of the light. Hence they are naturally the allies of Paris and the enemies of Theseus and of the Lykians; and their defeat is nothing more than the dispersion of the gloom-bringing vapours.

The name, Amazon, it is possible, may not be Greek; but this is not likely, and the word may just

as easily mean children nurtured at one breast, as women who have a breast cut off. That it means this in the case of these antagonists of Theseus and Bellerophon, is rendered more likely by the words Adelphos, Adelphoi, denoting children of the same mother—that is, brothers and sisters. We have to remember that the Greeks did not know their own language critically, and were therefore constantly giving wrong explanations of its words. In fact, when they tried to account for their origin, they were very seldom right. We shall see this in many instances further on.

AMNISIAD NYMPHS.—These are nymphs of the rivers, and attendants of the goddess Artemis, who with them chases her prey on the Arkadian mountains. The Greek word Nymphê, *nymph*, answers to the Latin Lympha, *water;* and therefore the nymphs correspond exactly to the old Hindu Apsaras, or maidens inhabiting the waters, apa, in Latin aqua. See ACHERON.

AMOR.—A Latin word meaning love, and sometimes used to denote the being who wins the love of Psyche. But here Amor represents the Greek Eros; and we shall speak of the story of their loves under the heads Eros, and Psyche.

(*To be continued.*)

—o—

How I Teach Domestic Economy.

BY MRS. WIGLEY,

Author of 'Marshfield Maidens,' 'Our Home Work,' 'Workers at Home,' 'Royal Series Domestic Economy,' 'Cookery and Home Comforts,' 'The Merryweathers,' 'Thoughts,' etc.

CHAPTER XII.

FOOD CLASSIFIED.

IT will be well now if we recapitulate some of our previous lessons in order to secure a firm foundation for future work.

We have learned that food has to serve many purposes in the human body. By food we are nourished and kept in repair, and by food we are warmed. And though some parts of the body may be entirely different from the other parts, yet the food we eat must contain a supply adequate to meet the needs of every member, nerve, and organ, however diverse may be the compounds of which they are formed.

Food may be divided into four great divisions:—

I. Foods which contain the lime, the salts and phosphates, and the metals which are required for the healthy formation of some parts of the body. These we call Mineral Foods.

II. Foods which make flesh, with its innumerable cells, and fibres, and tissues, and which therefore supplies the waste and decay which is constantly going on within us in bone, and muscle, and brain, and nerve. These we call Flesh-forming or Nitrogenous Foods.

III. Foods which supply the carbon by means of which heat and energy are generated, so that our regular internal heat is kept up. These we call Warmth-giving, Respiratory, or Carbonaceous Foods.

IV. Foods which supply the large amount of liquid necessary to us. These consist mainly of water, with some addition to gratify the taste, or to serve some nutritive purpose, such as tea, coffee, cocoa, malt, etc. These we call Liquid Foods.

And then we may proceed to give further information, as follows:—

I. *Mineral Foods.*—The minerals which are necessary to the building up of the body are principally:

1. Common Salt or Chloride of Sodium.
2. Potash Salts.
3. Phosphate and Carbonate of Lime.
4. Iron, Sulphur, etc.

1. *Common Salt* is found throughout the body—in the blood and bile, the gastric juice, etc.

2. *Potash* is found in all tissues and liquids.

3. *Phosphate and Carbonate of Lime*, found in bones and teeth.

4. *Iron*, etc., found in small quantities throughout the body.

II. *Nitrogenous Foods.*—There are very many compounds which may be classed with the flesh-formers—such as, Albumen, Fibrin, Gluten, Gelatine, Casein, Legumin, etc. But as the chief difference between some of these foods consists in their being found in different products, we will take only three of them:—

1. Albumen.
2. Fibrin.
3. Casein.

1. *Albumen* is a very important nutritive food. It is found almost pure in the white of an egg, in most juices of vegetables, in the blood of animals, and in certain seeds. It is considered to be the most digestible of the flesh-formers.

2. *Fibrin* also is found in vegetables and animals. The flesh of animals will supply about fifteen per cent. of fibrin, and wheat-grain about ten per cent.

3. *Casein* is found in milk products, and contributes three-quarters of the nutriment found in the curd of which we make cheese. A substance almost identical with casein is found in peas and beans; this is called Legumin. Legumin or Vegetable Casein is the more readily digested of the two.

III. *Carbonaceous Foods.*—These are the foods which are most rich in carbon, though all animal and vegetable substances contain some. They are of three kinds:

1. Farinaceous Foods.
2. Saccharine Foods.
3. Oleaginous Foods.

1. *Farinaceous Foods.*—These are the starchy or floury foods. Starch is the most important of all the heat-givers. We find it in all the grain plants, as wheat, rice, Indian corn, and also in potatoes, sago, etc.

The following table will show the quantity of starch found in every 100 lbs. of the foods named:—

	Lbs.		Lbs.
Sago, tapioca, corn flour	83	Oatmeal	63
Pearl barley	76	Millet	61
Rice	76	Peas	51
Fine wheat flour... ...	74	Haricot beans	51
Wheat	71	Wheaten bread	48
Rye	71	Bran	44
Buckwheat	64	Potatoes	15
Maize	64	Parsnips	3

2. *Saccharine Foods.*—These are the sweet, sugary foods. The sources from which we obtain them are various.

First we have cane sugar, which is derived from the sugar-cane, and the beetroot.

Many grass-like plants produce sugar, also trees, like the maple. It has been said that all vegetables contain traces of sugar, and that if all other

supplies were to fail, we could obtain it from sawdust.

Besides cane sugar we have grape sugar, or glucose. This is found most largely in sweet fruits, and makes the bulk of honey.

'Grape sugar is abundantly distributed throughout the vegetable kingdom. It can be readily made from starch, dextrine, and cane sugar, and by the action of weak acids. But perhaps a still more remarkable mode of obtaining this sugar is by means of the action of strong sulphuric acid upon cellulose, the substance which forms the main compound of paper, cotton, linen rags, and some woods.

'Thus it happens that all these substances are now used for the manufacture of grape sugar, or glucose, as it is called.'—PROFESSOR CHURCH.

There is also a sugar called lactose in milk; this has the same composition as glucose.

Table showing the weight of cane sugar in every 100 lbs. of:—

	Lbs.		Lbs.
Carob beans	51	Chinese sugar grass ...	9
Sugar-cane juice	18	Maize stem juice	7
Beet-root	11	Sugar maple sap	2

Table showing the weight of glucose sugar in every 100 lbs. of:—

	Lbs.		Lbs.
Honey and nectar of flowers	80	Tomatoes	6
Dried Turkey figs ...	57	Malted barley	5
Grapes	13	Cucumbers	2

3. *Oleaginous Foods.*—These are the oily or fatty foods. Such foods form a valuable agent in generating heat. We make use of them in butter, milk, cheese, animal food, or meat, also in nuts of all kinds, and in cocoa.

There are many useful purposes to be served in the body by fatty food:—

1. It is the most easily made use of for the production of heat. We know that in cold climates the inhabitants eat a large quantity of such food, and drink the oil procured from animals. We ourselves relish fatty foods far more in cold weather.

2. It deposits itself under the skin, and forms a kind of cushion, preventing jars and shocks, and makes an extra covering to keep in the warmth.

3. It makes the bones less brittle.

4. It helps the process of digestion.

Table showing the quantity of carbon in various carbonaceous foods:—

	Ozs.	Grns.	
In 1 lb. Starch there is ...	7	52	of carbon.
,, ,, Cane sugar ...	6	322	,,
,, ,, Grape sugar ...	6	175	,,
,, ,, Oil or fat ...	12	98	,,

(*To be continued.*)

—o—

IN our new Volume our readers will find a series of Lessons in Trigonometry, by the Rev. A. D. Capel, author of 'Catch' Questions in Arithmetic.' Easy proofs, both geometrical and analytical, will be given, and every step impressed on the mind by numerous examples; hints for the solution of which will be given in each ensuing month.

These lessons are especially prepared for those who wish to learn the principles of the science as a foundation, not only for its practical use, but for other branches of mathematical knowledge.

Lessons in Latin.

BY THE REV. A. D. CAPEL, M.A., CANTAB.,
Formerly Examiner of Schools to Cambridge Local Examination Syndicate.

(*Continued from page* 493.)

KEY TO EXERCISES.

EXERCISE 69.

A.

1. Titus was of so great courtesy and liberality that he could not deny anything to any man. 2. He is a man of old-fashioned and too-hard severity. 3. Plinius was able to sell his commentaries for four hundred pieces of silver. 4. Lycurgus ordered that things one by one should be purchased, not with money, but by barter. 5. Three books are sold for a price by no means less than that which had been asked for all. 6. King Attalus bid one hundred talents for a picture of Aristides, the painter of Thebes. 7. Themistocles persuaded the people that a fleet of one hundred ships should be built. 8. A wise man makes pain of little moment. 9. That victory cost much blood and many wounds to the Carthaginians. 10. Darius wished to buy the murderer of Alexander for a thousand talents.

B.

1. Tarquinius fratrem habuit mitis ingenii juvenem. 2. Cyrus minor, quum Lysander, vir summae virtutis, venisset ad eum Sardis, eique dona a sociis attulisset, humanus fuit. 3. Vendidit hic auro patriam. 4. Varrus est homo summa religione et summa auctoritate praeditus. 5. Quam multi indigni luce sunt, et tamen dies oritur. 6. Descendam magnorum haud unquam indignus avorum. 7. Hi apud majores nostros tali honore digni fuerunt. 8. Magni judicii summae etiam facultatis esset debet orator. 9. Denis in diem assibus, anima et corpus aestimantur. 10. Quanti emi potest? Minimo.

EXERCISE 70.

A.

1. If one has written bad (*i.e.*, libellous) verses on another, there is (a remedy at) law. 2. They began to fortify the towns and to make laws; that there should not be any thief, nor robber, nor any adulterer. 3. We must always seek some persons whom we may love. 4. Perchance somebody or other, at some time or other, may have done a thing of the kind. 5. An inheritance is money, which by somebody's death has come to any one by right. 6. Zeuxis painted pictures, some of which have remained to our time. 7. No fishes have more than four fins, some two, a few none at all. 8. Plato used to say that in ideas there was something divine. 9. Aegesilaus was lame of one foot. 10. The consuls were discussing how that one of the two should choose the Samnites for enemy, the other the Etruscans, and which commander was more suitable for which war.

B.

1. Nihil attinet quicquam sequi, quod assequi non queas. 2. Quodam tempore natus sum; aliquo moriar. 3. Ut saltatori motus non quivis sed certus quidam est datus, sic vita agenda est certo genere quodam non quolibet. 4. Id utut est, etsi dedecorum est, patiar. 5. Sensus morienti aliquis esse potest. 6. Fortasse non jejunum hoc, nescio quid, quod ego gessi et con-

temnendum videbitur. 7. Errant siqui in bello omnes secundos rerum proventus expectant. 8. Iniquum me esse quispiam dicet. 9. Timebat Pompeius omnia, ne aliquid vos timeretis. 10. Sed ut quicquid apprehenderam, statim accusator extorquebat e manibus.

EXERCISE 71.

A.

1. I cannot be hurt by those (people). 2. It was resolved that letters should be written in the name of the prince. 3. It was told us by Varro that he had come from Rome. 4. Labour will not be spared. 5. The people of Antium were refused the (use of the) sea. 6. Nothing seems to Xenophon so royal as zeal for cultivating the land. 7. Who is ignorant of the barbarous custom of sacrificing men? 8. Timotheus was skilled in waging war, and no less so in ruling a state. 9. There remains Chremes, whom I must prevail upon. 10. Regulus, for the sake of retaining office, underwent voluntary torture.

B.

1. Sic itur ad astra. 2. Omne animal confitendum est esse immortale. 3. Non corpori soli subveniendum est, sed menti atque animo multo magis. 4. Decemviros legibus scribendis intra hos decem annos et creavimus et e republica sustulimus. 5. Omnis loquendi elegantia augetur legendis oratoribus et poetis. 6. In voluptate spernenda, virtus vel maxime cernitur. 7. Agitur utrum M. Antonio facultas detur opprimendae rei republicae. 8. Aedui legatos ad Caesarem sui purgandi gratia mittunt. 9. Orandum est ut sit mens sana in corpore sano. 10. Valerius consul comitia collegae subrogando habuit.

LESSON LXXII.

FIGURES OF SYNTAX.

574. *Figure* is the name given to certain deviations from the general analogy of the language.

575. In this lesson we shall confine ourselves to those figures which refer to syntax, leaving those in etymology and rhetoric to others.

576. *Enallage* is the use of one word for another, of which there are the five following principal classes :—

(1) *Antimeria* is the use of one part of speech for another, as 'Aliud cras,' for 'Alius dies crastinus,' 'Another to-morrow.'

(2) *Antiptosis* (Greek, *piptein;* cadĕre, to fall), the use of one *case* for another. This is frequently found in a relative clause, when the changed case is said to be *attracted* into its new form.

(3) *Heterosis* (change) of numbers, moods, and tenses. These are not found in classical prose, but are a common resort of poets.

(4) *Hypallage* is an interchange of cases, as 'Dare classibus Austros,' for 'Dare classes Austris,' the former of which really means 'To give the winds to the ships.'

(5) The *attraction of an epithet* to agree with another word than that to which it really belongs, as 'Fontium gelidae perennitates,' for 'Fontium gelidorum perennitates,' 'The perpetual durations of cold fountains.'

577. *Ellipsis* denotes omission, and to it are referred all those expressions in which a word is left out which is either a part of a phrase or necessary for the syntactical construction.

578. *Pleonasm*, of which *hendiadys* (two in one) is a species, is just the opposite of *ellipsis*, being the use of more words than are necessary for the expression of the thought. Such words used to be parsed as being 'beautifully redundant.'

579. *Synesis* (sense) takes place when the predicate does not agree in grammar, but in sense, with its subject, as 'Pars (sing.) in crucem acti sunt (plur.)'—'Part were driven,' etc.

580. *Zeugma* is when two substantives have a verb in common which is applicable only to one, as 'Pacem an bellum gerens'; literally, 'Waging peace or war.'

581. *Syllepsis* (taking together) is the connection of one adjective or verb with several substantives.

582. *Asyndeton* (without binders) is the omission of sociative conjunctions, and is a kind of ellipsis, just as

583. *Polysyndeton* (many binders) is a redundancy of conjunctions.

584. *Anacoluthon* (not following) takes place when the latter part of a sentence does not agree in syntax with the former; this usually happens when a parenthesis has intervened, so that the author has lost sight of his construction.

585. *Hysteron-proteron* (the latter-former) is when of two things, that which naturally comes first is mentioned last.

586. VOCABULARY 72.

English.	*Latin.*		*Derivatives.*
To rush	ruĕre	P. R. ru	3rd R. rut
Late	sērus -ra -rum	R. ser	sere
To declare	dēclārāre	R. declar	declaration
To think	rēri, dep.		3rd R. rāt
Lest	nē, conj. for 'ut non'		
To delay	cunctāri, dep.		
Some	aliquot, indecl. indef. pronoun		
Fruit	frux	G. frūgis, f., seldom used in singular	
To bake	torrĕre	P. R. torru	3rd R. tost
Flame	flamma	G. flammae	inflammation
Very many	plerique -raeque -raque, rare in singular		
To demand	postulare	R. postul	postulate
Agreement	conditio	G. conditionis, f.g.	
To insert	interponere	P. R. interposu	3rd R. interposit
To depart	excedĕre	P. R. excess	3rd R. excess
To burst forth	ērumpĕre	P. R. erup	3rd R. erupt
Lofty	excelsus -sa -sum	R. excels	
Great	amplus -pla -plum	R. ampl	
To expose	objicĕre	P. R. objĕc	3rd R. object
Splendour	splendor	G. splendōris	
Beauty	pulchritudo	G. pulchritudĭnis	
Few	paucus -ca -cum	R. pauc	paucity
To fortify	communire (see 70)		
Thereupon	inde (see 43)		
Thong	lōrum	G. lori	
Stern (of ship)	puppis	G. puppis, Ac. puppim	
Narrow	artus -ta -tum, part of arceo, to inclose		
Rugged	praeruptus -ta -tum, part. of praerumpĕre, to break off		
To rush	ēvādĕre	P. R. evās	3rd R. evās
To throw down	praecipitare	R. praecipit	precipitate
Courage	animus	G. animi (see 45)	
The east wind	Eurus	G. Euri	
The south wind	Nōtus	G. Noti	
The south-west wind	Africus	G. Africi	
Crowded / Frequent	frĕquens	G. frequentis	
Storm	prŏcella	G. procellae	
Cross	crux	G. crūcis	crucial
Throw to (to)	objicĕre (see 67 and 43)		object
Beast	bestia	G. bestiae	
To pour forth a libation	lĭbāre	R. lib	
A saucer	pātĕra	G. paterae	
Complaint	quĕrimōnia	G. querimoniae	
Meeting	conventus	G. conventūs	convent

587. EXERCISE 72.

[The numbers inserted at the beginning of each sentence refer to the paragraphs describing the different figures.]

A.

1. [585] Moriamur (59) et in media (35) arma (36) ruamus. 2. [576 (1)] Serus in coelum (27) redeas (56). 3. [582] Ex quo (27) die (8) dux (39) est declaratus, nihil (31) morandum (56) ratus, ne se (35) quoque (20) ut patrem (14) Hamilcarem, deinde (19) Hasdrubalem, cunctantem casus (55) aliquis (70) opprimeret (40) Saguntinis inferre (53) bellum (16) statuit (54). 4. [579] Sex millia (44) hostium (10) caesa (43) duo (44) capta (26) cum (20) praesidio (9) castrorum (37); nam et castra (37) expugnata (17) sunt atque (33) ipse (40) dux (39) cum (20) aliquot principibus (43) capiuntur (26). 5. [585] Frugesque receptas (29) et torrere parant (52) flammis et frangere (43) saxo (58). 6. [580] Plerique negant (53) Caesarem in conditione mansurum (23) postulataque haec ab eo interposita esse ('affirmant' is understood, being implied in the 'negant'). 7. [578] Factus (43) Scipio est consul (63) bis (61), primum (47) ante (67) tempus (17), iterum (20) sibi (35) suo (20) tempore (17). 8. [577] Senatus (19) habitus (49) est ad (67) Apollinis (supply 'aedem') septimo (47) ante Calendas (47) Octobres. 9. [582] Abiit (56) excessit evasit (42) erupit. 10. Quae (27) qui in utramque (57) partem (1) excelso animo (54) magnoque (20) despiciunt (59), cumque aliqua (70) his (37) ampla et honesta (61) res (13) objecta est, totos (31) ad se (35) convertit (41) et rapit (13); tum (20) quis (70) non admiretur (62) splendorem pulchritudinemque virtutis (26)?

B.

1. [577] Hannibal after (17) a few days (8) fortified a camp (37) six thousand (44) (paces) from Placentia. 2. [579] A great (20) part (1) of the horses (13) swimming (plural) (16) were drawn (26) by thongs from the sterns (of the ships). 3. [579] A flight (35) of a great (20) part (1) thereupon for the first (time) (47) began (37); and now (33) neither (48) lake (44) nor (48) mountains (22) stopped ('obstare') the panic ('pavor'); through (3) all (29), (places) narrow and rugged as blind (men) (45) they rush, and arms (36) and men (18) are thrown down one (n. m., pl. of 'alius') over the other (ac, m. s. of 'alius') (31). 4. [580] Arms (36) and courage (pl.) fall (64) (from) (*i.e.*, decrease) the men (18). 5. [576 (3)] Soon (20) I shall sail (67) (use pres.) to Ephesus. 6. [582] Together (64) both (71) the east wind and the south wind rush ('ruere'), and the south-west wind, crowded with storms. 7. [579] A part (1) were driven (plural) (50) to (use 'in') the cross, a part (1) were thrown (to) the beasts. 8. [578] We pour forth a libation from golden (40) saucers (say 'from goblets and gold') (sing.). 9. [584] If, (15) as (63) the Greeks (44) say (62), all (29) are (use inf.) either (53) Greeks or (53) barbarians (45), I fear (48) that Romulus was a king (8) of barbarians (54). 10. [580] Complaints (were heard) and meetings were held (imperfect) (49).

LESSON LXXIII.

ARRANGEMENT OF WORDS.

588. In arranging the words of a sentence, two things must be attended to: (1) The emphatic word, both of a phrase and of a proposition, is placed first, and (2) the different parts of an idea should be placed as near together as possible.

589. In a Latin sentence we generally find this order:—1st, the conjunction, if any; 2nd, the subject with its attribute; 3rd, the oblique cases; 4th, the adverb; and lastly the verb.

590. The object of this arrangement is to avoid, as is so common in modern languages, the introduction of a train of subordinate and additional matters *after* the expression of the principal idea.

591. Next to the first word of the sentence the last is the most important to the sense, and if the verb is not at the end of the sentence, we generally find a weighty noun.

592. The verb generally precedes the nominative when there is a long descriptive clause of the subject subjoined to it.

593. As a general rule, that which is governed precedes that by which it is governed.

594. The genitive, by paragraph 593, generally precedes the noun that governs it.

595. The ablative precedes the comparative, and the accusative its verb.

596. The adjective often precedes the noun it qualifies, but when it does not do so the emphasis is on the noun.

597. Demonstrative and possessive pronouns almost always precede their substantives.

598. Prepositions are generally before, and (except 'per' in adjurations) immediately before their case, or with only a dependent genitive intervening.

599. When a preposition governs a case qualified by an adjective, the preposition (especially monosyllabic) may be introduced between the adjective and the substantive.

600. Any deviation from these rules imply emphasis to the former word.

601. VOCABULARY 73.

English.	*Latin.*		*Derivatives.*
To wage	gĕrĕre	P. R. gess	3rd R. gest
To forbid	vĕtāre	P. R. vetŭ	3rd R. vetit
To rule over	dominare	R. domin	dominate
Without command	injussus, only found in Abl.		
To depart	dē-migrāre	R. demigr	
Unnatural to man	inhūmanŭs -na -num		inhuman
De-truction	pernicies	G. perniciei	pernicious
Fru tful	frūgĭfĕr -ra -rum	R. frugifer	
To pray	precari, dep.	R. prec	imprecation
To entreat	quaesĕre	P. R. quaesīv	quae.it
Illu trious	illustris, n. -tre	G. illustris	
Tax	vectigal	G. vectigalis, n.g.	
Thrift	parsĭmōnia	G. parsimoniae	parsimony
Neighbour	propinquus	G. propinqui, properly an adjective	
Once	semel, adv.		
Slavery	servitus	G. servitutis	servitude
To perjure	perjerare	R. perjer	
To think	sentire	P. R. sens	sens
Meagre	inops	G. inŏpis	
Rich	lŏcŭples	G. locuplētis, lit. 'full of places'	
Agriculture	agricultūra	G. agriculturae	
To distribute	distribuere	P. R. distribu	3rd R. distribut
To recognise	agnoscĕre	P. R. agnov	3rd R. agnōt
Greece	Graecia	G. Graeciae	
Lyre	fides	G fidis, generally used in plural	
Burden	onus	G. oneris	onerous

602. EXERCISE 73.

A.

[*Note.*—The numbers at the beginning of each sentence refer to the paragraph illustrated.]

1. [595] Bellum (16) scripturus (47) sum, quod (27) populus (16) Romanus cum (67) Jugurtha gessit. 2. [592] Vetat enim (54) dominans ille (37) in nobis (35) Deus (27) injussu nos (35) hinc (35) suo (20) demigrare. 3. [598] Quid (30) est tam (58) inhumanum quam eloquentiam (27) ad bonorum (20) perniciem convertere (41). 4. [598] Per ego (35) te (35), fili (7) quaecunque (70) jura (70) liberos (11)

jungunt (41) parentibus (11) precor quaesoque. 5. [600] Ut (63) agri (5) non omnes (29) frugiferi sunt (38) qui (27) coluntur (71), sic (50) animi (54) non omnes culti (71) fructum (28) ferunt (53). 6. [597] Themistocles jure (70) laudatur (2), et est ejus (37) nomen (20) quam Solonis illustrius. 7. [600] Non intelligunt (63) homines (5) quam (55) magnum (20) vectigal sit (38) parsimonia. 8. [593] Non solum (37) nobis (35) divites (46) esse volumus (53) sed liberis (11) propinquis, amicis (5). 9. [600] Ubi (49) semel quis (70) perjeraverit ei (37) credi (55) postea (16) non oportet (48). 10. [596] Ita (17) sentio Latinam linguam (22) non modo (50) non inopem sed locupletiorem etiam esse quam (48) Graecam.

B.

[The emphatic words are printed in italics.]

1. [595] Nothing (31) is better (49) than *agriculture*, nothing more worthy of (56) a free (68) man (5). 2. [594] The death (8) of thy (20) *brother* (14) was (38) very bitter to me (35). 3. [598] The blood (35) is distributed by the heart (5) over (use 'in') the whole (31) body (15). 4. [597] We recognise God by (use 'ex') *His* (37) works (13). 5. [597] Epaminondas, prince (43) of Greece (according to) *my* (20) judgment (43) sang (30) to the lyre. 6. [597] All (29) good (20) men (18) love (2) equity *itself* (40) (that is, for its own sake). 7. [593] I bore (60) more (49) of a burden than I think (use 'intelligo,' 63) I was able (50) *to bear* (53). 8. [600] Death (8) is to be preferred (45) to *slavery and* (16) *baseness* (63). 9. [600] Wisdom (6) is not only (45) to be *prepared* (53) by us (35), but also (45) enjoyed (45). 10. You ought (46) to consider ('look,' 60) what (30) becomes (48) you, not how much (59) is lawful (48) to you (35).

LESSON LXXIV.

603. Instead of a lesson, we purpose giving a continued piece of an old author for the student to try his hand on. He will find some of the sentences somewhat long. He is advised to translate them both literally and freely. Notes will be added to the translation, which will be given next month, and a set of questions will be given on it and the last few exercises.

604. VOCABULARY 74.

English.	*Latin.*	*Derivatives.*
To strive	contendere P. R. contend	3rd R. content
Ambition	ambitio G. ambitiōnis	
Fraud	dŏlus G. doli	
To exercise	exercēre P. R. exercu	3rd R. exercīt
Deceits	fallacia G. fallaciae	fallacious
Equally	aeque, adv. of aequus -qua -quum	
Desire	studium G. studii (see Voc. 30)	studious
To saturate	imbuĕre P. R. imbu	3rd R. imbūt
To desire	concupiscĕre P. R. concupīv	3rd R. concupīt
Manly	virilis, n. virile	
To weaken	effeminare R. effemin	effeminate
Infinite	infinītus -ta -tum	infinity
Insatiable	insatiabilis, n. -le	
Abundance	cōpia G. copiae (see Voc. 46)	
Want	inŏpia G. inopiæ	
To recover	rĕcipĕre P. R. recēp	3rd R. recept
Result	eventus G. eventūs	event
To diminish	minuere P. R. minu	3rd R. minut
To seize	răpĕre P. R. rapu	3rd R. rapt
To plunder	trăhĕre P. R. trax	3rd R. tract
To covet	cŭpĕre (i.) P. R. cupi	3rd R. cupit
Moderation	mŏdus G. modi (see Voc. 56)	
Filthy	foedus -da -dum R. foed	
To happen	accĭdere P. R. access	3rd R. access
That	quod, conj.	
To lead about	ductare R. duct	
Luxurious	luxuriosus -sa -sum	
Pleasant	amoenus -na -num	amenity
Sensua	voluptarius -ria -rium, neut., used as noun.	
Fierce	fĕrox G. ferocis	ferocious
Ease	ŏtium G. otii	
To soften	mollīre P. R. mollīv	3rd R. mollīt
To accustom	insuescĕre P. R. insuēv	3rd R. insuet
To drink	pōtāre R. pōt	potation
Statue	signum G. signi, anything engraved.	
To engrave	caelare R. cael	
Privately	prīvātim, adv.	
Temple	delubrum G. delubri, usually plur.	
Profane	profanus -na -num R. profan	
To pollute	polluere P. R. pollu	3rd R. pollūt
To obtain	ădīpiscī, dep.	3rd R. adept
The rest	reliqui, plur. of reliquus -qua -quum.	

605. EXERCISE 74.

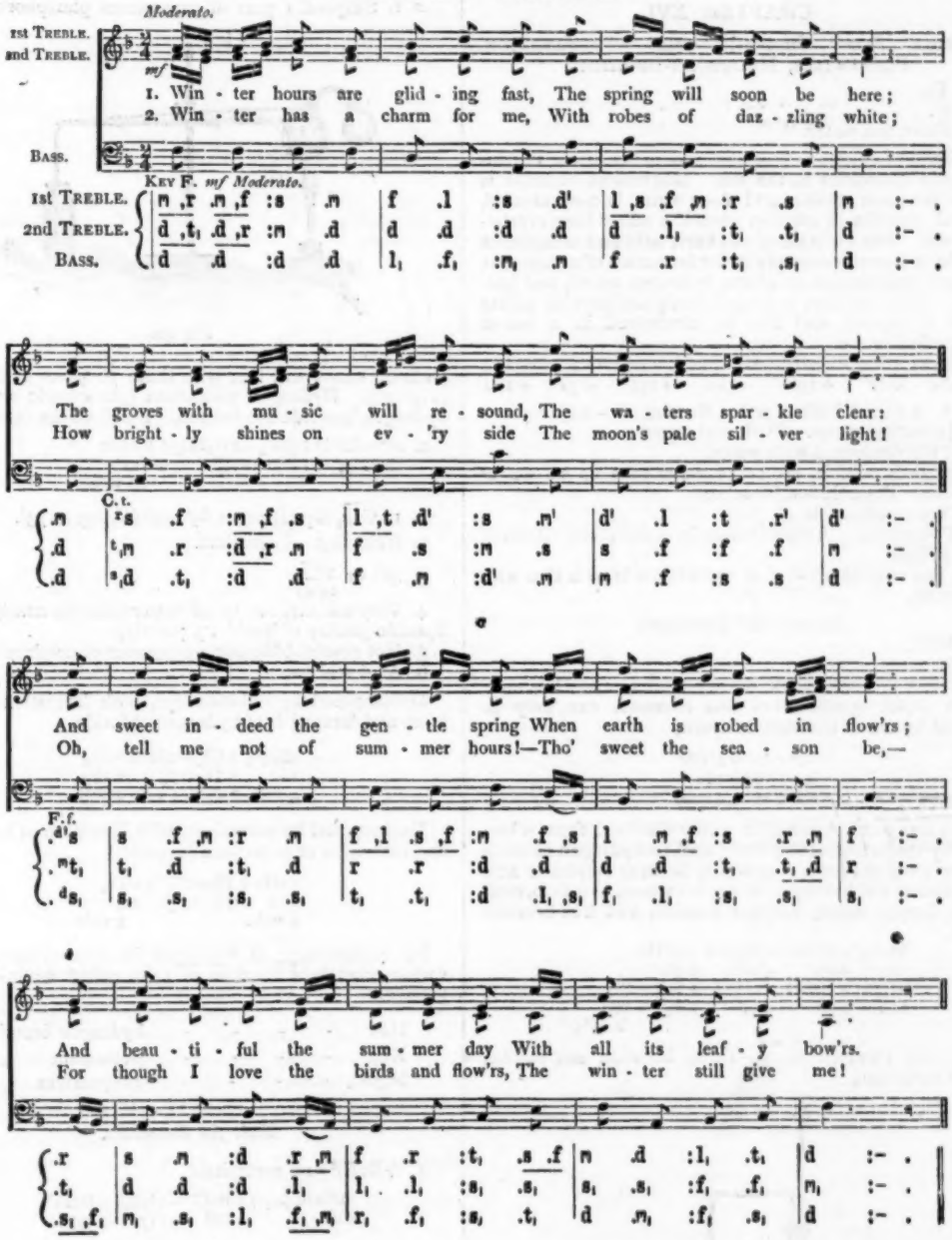
Translate carefully the following passage of Sallust's 'History of Catiline,' chap. xi. :—

Sed (6) primo (47) magis (45) ambitio quam (48) avaritia (53) animos (45) hominum (5) exercebat, quod (27) tamen (20) vitium (46) propius (49) virtutem (26) erat. Nam gloriam (53), honorem (49), imperium (19) bonus (20) [et] ignavus (54) aeque sibi (35) exoptant; sed (6) ille a (37) vera (29) viâ (48) nititur (64), huic (37) quia (7) bonae (20) artes (49) desunt (50), dolis atque (33) fallaciis contendit. Avaritia (53) pecuniae (45) studium habet (7), quam (27) nemo (17) sapiens (49) concupivit; ea (37) quasi (20) venenis (33) malis (33) imbuta corpus (15) animumque (54) virilem effeminat, semper (33) infinita, insatiabilis [est] neque [see 'nec,' 48] (4) copia neque inopia minuitur. Sed (6) postquam (43) L. Sulla, armis (36) recepta republica, (45) bonis (20) initiis malos (33) eventus habuit (7), rapere omnes, trahere, domum (1) alius (31), alius agros (5) cupere, neque modum, neque modestiam (27) victores (42) habere (7), foeda crudeliaque (54) in civibus (8) facinora (62) facere (43). Huc (16) accedebat quod L. Sulla exercitum, (19) quem (27) in Asia ductaverat, quo sibi (35) fidum (63) faceret (31) contra morem (56) majorum (31) luxuriose nimisque (69) liberaliter (68) habuerat, loca (29) amoena, voluptaria facile in otio feroces militum (6) animos (54) molliverant. Ibi (28) primum (47) insuevit exercitus (19) populi (16) Romani amare (2), potare, signa, tabulas (41) pietas (70) vasa (62) caelata mirari (45), ea (37) privatim et publice (50) rapere, delubra spoliare (66), sacra (40) profanaque omnia (29) polluere. Igitur (30) hi (37) milites (6) postquam (43) victoriam (37) adepti sunt, nihil (31) reliqui victis (54) fecerunt (43).

(To be continued.)

OZONE.—It has been recently discovered by Drs. Anders and Miller that both odorous and inodorous flowering plants generate ozone. Scented foliage, especially pine and hemleck, produces it, in the presence of the sun's rays, or at least a good diffused light. 'Since the exhalations from pine foliage are active agents in generating ozone, it follows that all the hygienic advantages of ozone are to be derived, to a marked degree, from the presence of pine forests.'

STARCH. — The *American Microscopical Journal* describes an easy way of showing starch granules in leaves. A fresh leaf should be placed in boiling water for ten minutes, after which the chlorophyll should be extracted by placing it in alcohol. The cells of the leaf are thus rendered colourless and are not broken. The starch inside them can then be shown by means of iodine. Comparative experiments can be made by exposing part of the leaf to the sun, while the rest is protected; and it is said that a leaf gathered in the evening shows more starch than one gathered in the morning.

LOVE OF WINTER.

Moderato.
1st Treble.
2nd Treble.
Bass.
mf
1. Win - ter hours are glid - ing fast, The spring will soon be here;
2. Win - ter has a charm for me, With robes of daz - zling white;
Key F. mf Moderato.
1st Treble.
2nd Treble.
Bass.
The groves with mu - sic will re - sound, The wa - ters spar - kle clear:
How bright - ly shines on ev - 'ry side The moon's pale sil - ver light!
C. t.
And sweet in - deed the gen - tle spring When earth is robed in flow'rs;
Oh, tell me not of sum - mer hours!—Tho' sweet the sea - son be,—
F. f.
And beau - ti - ful the sum - mer day With all its leaf - y bow'rs.
For though I love the birds and flow'rs, The win - ter still give me!

Chemistry of the Non-Metallics.

[This series of articles, whilst dealing with the subjects required by the University of London for the Matriculation Examination and with those required at the Elementary Stage of the Inorganic Chemistry (Branch X.) Science and Art Department, is intended as a practical guide to the philosophical and systematic study of the non-metallics.]

CHAPTER XVI.

BROMINE, βρωμος (bromos)=stench. PREPARATION, PROPERTIES, HYDROGEN-BROMIDE.

A. Br.
B. 8°.
C. From sea water.

1. Salts of chlorine, bromine, and iodine occur in considerable quantities in the sea. Magnesium bromide is one of the most soluble, and if sea water is concentrated, this salt remains in solution when the others have crystallised out. The addition of sulphuric acid and manganese dioxide to the water results in the formation of manganese sulphate, magnesium sulphate, hydrogen oxide, and bromine. If the solution is heated gently the bromine passes off as a vapour, and can be condensed in a vessel surrounded by ice.

2. $MgBr_2 + MnO^2 + 2H^2SO^4 = MgSO^4 + MnSO^4 + 2H^2O + Br_2$.
3. 184 +87 +196 =120 +151 +36 +160.

D. 1. A liquid, boiling at 60°, freezing at $-24\frac{1}{2}$.
2. Irritating odour. Dark red colour.
3. 3·187 compared with water.
4. Slightly soluble, 100 cc. of water take up 3·6 cc. of bromine. The solution bleaches.
5. Not combustible.
6. Poisonous. Attacks organic substances, staining them yellow.

E. The only compound of importance to us is that with hydrogen.

HYDROGEN-BROMIDE.

a. HBr.
b. 81.
c. FIRST PREPARATION.—From hydrogen and bromine. The direct synthesis of two elements can only be effected by aid of the electric spark,

$$H^2 + Br^2 = 2HBr$$
$$2 + 160 = 162$$
2 vols. 2 vols. 4 vols.

This compound cannot be easily obtained from a bromide by the action of sulphuric acid, as hydrogen chloride can be obtained from a chloride, because sulphuric acid decomposes the hydrogen bromide as soon as it is formed, and hydrogen oxide, sulphur dioxide, and free bromine result.

$MgBr^2 + H^2SO^4 = MgSO^4 + 2HBr$
184 +98 =120 +162
$2HBr + H^2SO^4 = 2H^2O + SO^2 + Br_2$
162 +98 =36 +64 +160
2 vols.

SECOND PREPARATION.—From bromine and sulphuretted hydrogen.

Fig. 45.

1. Pass a current of sulphuretted hydrogen through the solution of bromine in water (Fig. 45). Sulphuric acid and hydrogen bromide are formed, whilst sulphur is deposited. Filter to get rid of the sulphur. Distil to drive off the hydrogen bromide and leave the sulphuric acid behind.

2. $5Br_2 + 4H^2O + 2H_2S = H^2SO^4 + 10HBr + S_2$
800 +72 +68 =98 +810 +32.

THIRD PREPARATION.—From bromine and phosphorus.
a. 1. Suspend 1 part of amorphous phosphorus in 15

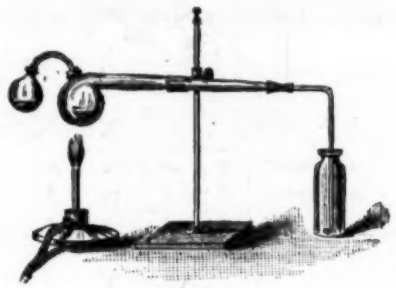


Fig 46.

parts of water, and mix with these 10 parts of bromine (Fig. 46). Hydrogen phosphate (phosphoric acid) and hydrogen bromide are formed. Distil off the latter.

2. $2P + 8H^2O + 5Br_2 = 2H_3PO_4 + 10HBr$
62+144 +800 =196 +810
20 vols.

b. 1. Gas, liquefying at 69°, solidifying at 73°.
2. Irritating. Colourless.
3. 40½ or $\frac{40{\cdot}5}{14{\cdot}47}$.
4. Very soluble, 100 cc. of water take up nearly 50 cc. Specific gravity of liquid 1·5 (nearly).
5. Not combustible nor a supporter of combustion.
6. Acid reaction.

Decomposed by chlorine gas, with liberation of bromine and formation of hydrogen chloride.

$2HBr_2 + Cl_2 = 2HCl + Br_2$
162 +71 =73 +160
4 vols. 2 vols. 4 vols. 2 vols.

Decomposed by potassium, with liberation of hydrogen and formation of potassium bromide.

$2HBr + 2K = 2KBr + H_2$
162 +78 =238 +2
4 vols. 2 vols.

By replacement of hydrogen in this compound by various metals a number of salts called bromides are formed.

HBr	- - - -	hydrogen bromide.
KBr	- - - -	potassium ,,
$MgBr_2$	- - - -	magnesium ,,

Tests for Bromides.

1. $+BaCl^2$=no precipitate.

$2NaBr\ (e.g.) + BaCl^2 = 2NaCl + BaBr^2$
206 +208 =117 +297.

2. $+AgNO^3$=yellowish-white precipitate, nearly all of which is soluble in ammonia.

$NaBr\ (e.g.) + AgNO^3 = NaNO^3 + AgBr$
103 +170 =85 +188

3. $+MnO^2 + 2H^2SO^4$=reddish flames of bromine vapour.

$2NaBr(e.g.) + MnO^2 + 2H^2SO^4 = Na^2SO^4 + MnSO^4 + 2H^2O + Br^2$
206 +87 +196 =142 +151 +36 +160.

QUESTIONS ON BROMINE. (*Solved.*)

103. At what temperature would 8 grams of bromine vapour occupy a volume of 1280 cc.?

80 grams bromine occupy 11200 cc. at 0°
1 gram ,, occupies $\frac{11200}{80}$,, ,,
8 grams ,, occupy $\frac{11200 \times 8}{80} = 1120$ bromine vapour.

∴ increase of volume = 1280 − 1120 = 160 cc. = $\frac{160}{1120} = \frac{1}{7}$ of vol. at 0°.

Increase of $\frac{1}{273}$ results from rise of 1° in temperature.
1 ,, 273 ,,
$\frac{1}{7}$,, $\frac{273}{7} = \underline{39°}$.

104. A solution containing 340 grams of silver nitrate is added to one that contains 210 grams of sodium bromide. What weight of which salt is left undecomposed?

170 grams $AgNO^3$ decompose 103 grams NaBr
1 gram ,, decompose $\frac{203}{170}$,, ,,
340 grams ,, decompose $\frac{103 \times 340}{170} = 206$
∴ 210 − 206 = 4 grams NaBr.

QUESTIONS ON BROMINE. (*For Solution.*)

107. Find the temperature at which 32 grams of bromine occupy a volume of 8960 cc. ... ... 273°.

108. Under what pressure is bromine vapour when 160 grams of it occupy at a temperature of 546° a volume = 44,800 cc.? ... ... 1520 mm.

109. What weight of silver nitrate is necessary for the complete precipitation of 59½ grams of potassium bromide? 85 grams.

(To be continued.)

—o—

My Scholarship Answers.

BY MISS KATE DEAN,

First on the Scholarship List, 1885.

School Management.

TRANSITIVE AND INTRANSITIVE VERBS.

Notes of a Lesson.

METHOD.	BLACKBOARD.
I. To show that all verbs may be divided into two great classes:—	
(*a*) Teacher writes on blackboard a list of selected sentences containing only subject and predicate.	(*a*) Birds fly. A tree grows. My father went. Fishes swim.
(*b*) And a second list containing subject, predicate, and object.	(*b*) The bird built a nest. This tree sheltered Mary. My father bought a book.
(*c*) Children read sentences under direction of teacher, who should, by questioning, bring out the fact that verbs may be divided into— 1. Those connected with only one noun. 2. Those connected with two nouns.	
II. To explain the difference more fully:—	
(*a*) Teacher asks children for sentences. Select suitable ones, and write on blackboard.	(1) The dog ran. Horses trot. The boys go.
(*b*) Children examine sentences.	(2) A tiger killed that man. The boy broke his slate. The sea washes the shore.
In (1) teacher shows that the 'dog' performed the action of 'running,' etc., and leads children to see that the *doer* and the *action* are alone spoken of. In (2) let children read, 'A tiger killed——.' They will discover that the sense is incomplete, and that sentences in this group consist of *doer*, *action*, and *sufferer*.	
III. To deduce definitions:—	
Teacher tells children that—	
(*a*) When the action passes over to some object the verb is said to be transitive.	(*a*) Latin, *trans* = across.
(*b*) When the action does not pass over to an object, but is confined to the doer, the verb is said to be intransitive.	(*b*) Latin, *in* = not. ,, *trans* = across.
Explain 'transitive' and 'intransitive' etymologically.	(1) A transitive verb is one expressing an action which passes over to an object.
Deduce definitions. Write on blackboard. Children repeat and learn them.	(2) An intransitive verb is one expressing an action which does not pass over to an object.
IV. Recapitulate and give exercises.	

3. In teaching reading to very young children some teachers begin with the alphabet, and others teach little words first, and afterwards call attention to the names of separate letters. Which of these methods do you prefer? and why?

The 'look-and-say' as a basis rather than the 'alphabetic method,' because—

(1) It is analogous to the process in which children become acquainted with the spoken language.
(2) Reading is essentially a matter for the eye.
(3) The appearance and sound of a word, as a whole, *must* be associated to secure good reading.
(4) It is less tedious than the alphabetic method, and more interesting to children.
(5) Whatever method is adopted, the 'look-and-say' enters largely into it.

Note.—The alphabet should first be learned, though this is strictly no part of the method. Careful attention *must* be secured, or a habit of guessing may arise.

Teacher should make a method of her own, which should embody the excellencies and exclude the defects of all methods.

4. Show how you would group or classify the letters of the alphabet for teaching the elements of writing to very young children. Explain by an illustration what use can be made of the system of threefold ruling on slate or copy-book.

(*a*) (1) First group within space } = *umnvwr*.
(2) Second group within space } = *ceoassz*.
(3) First group above space } = *tbdhk*.
(4) Second group above and below space } = *pqfgy*

CAPITALS.

(1) *I. T. F. S. L. Z.*

(2) *P. B. R. K. H. D.*

(3) *A. M. N. W. V.*

(4) *O. G. C. E. X.*

(5) *Y. U. V. 2.*

Physiography

5. What examples of figurative language occur in the following stanza, and how would you explain them to a higher class?

'Ah! who can tell how hard it is to climb
The steep where Fame's proud temple shines afar!
Ah! who can tell how many a soul sublime
Has felt the influence of a malignant star,
And waged with Fortune an eternal war—
Checked by the scoff of Pride, by Envy's frown,
And Poverty's unconquerable bar—
In life's low vale remote, has pined alone,
Then dropped into the grave, unpitied and unknown.'

(*a*) *Personification.*—This is representing inanimate things as having life and thoughts, *e.g.*, Fame, Fortune, Pride, Envy, Poverty.

(*b*) *Metaphor* expresses a resemblance without any sign of comparison. By it the image or name of one thing is put for another which it only resembles. For examples, see lines 1 and 2, 5, 7, and 8. Contrast with 'simile.'

6. Give some examples of suitable exercises in Mental Arithmetic adapted for scholars of the First and Fifth Standards respectively.

(*a*) STANDARD I.

(1) There are 3 rooms, each with 4 pictures. How many pictures are there?

(2) William's age is 17 years, Tom's 13. How many years is William older than Tom?

(3) Mary had 6 oranges, Tom 10, Harry 9. They ate 1 each. How many oranges were left?

(4) Harry and John played at marbles. Each had 5. Harry won 3. How many had each?

(5) There are 5 girls, each with 3 pencils in her pocket. How many pencils are there altogether?

(6) 5+7+2−5, etc.

(*b*) STANDARD V.

(1) 96 articles at 2s. 6d. each; at 1s. 3d. each; at 3s. 4d. each; at 1s. 8d. each, etc.

(2) 5 score at 3s.; 2s. 6d.; 3s. 4d. each.

(3) 6 dozen at 3¾d.; 9½d.; 10¼d. each.

(4) 586×99; ×999; ×2½; ×125, etc.

(5) Find the square of 58.

(6) Divide £50 between Tom and Harry so that Tom has £8 more than Harry.

(7) Extended exercises in the simple rules.

8. Give some rules which you intend to follow for securing (1) distinct articulation, (2) intelligent expression in reading.

(1) Carefully correct all such errors as the following:—
1. Aspirate misplaced or omitted; *e.g.*, 'hup,' 'ead.'
2. Final 'g' omitted; *e.g.*, 'singin'.'
3. Omission or slurring of allied sounds; *e.g.*, 'thishrub.
4. Omitting syllables in long words; *e.g.*, 'particlar.'
5. Introducing letters or syllables wrongly; *e.g.*, 'tremendious.'
6. All provincialisms and vulgarisms.
7. Overdue rapidity.

(2) Teach by pattern-reading, explanation, and illustration:—
1. That the tone and manner of the reader should be adapted to the nature of the subject.
2. That due emphasis should be placed on certain words to bring out the correct meaning; *e.g.*, 'Do you walk to London to-day?'
3. Rate and proper pauses, that the eye may go before the voice, and so give fluency and ease.
4. Inflection and modulation of voice, so that the reading may not become monotonous.

14. Of the two methods of explaining subtraction (1) equal additions: (2) decomposition: which do you prefer, and why? Illustrate your answer by an example.

(*a*) The method of decomposition.

(*b*) Because:—(1) If the children thoroughly understand decomposition of numbers, they will have no difficulty in applying it to subtraction.

(2) They will be familiar with the process; and, therefore,

much more likely to remember the reason, as well as the rule, for each step, thus making their knowledge more intelligent.

(*c*) When children have been led to see that we subtract the whole number when we subtract all its parts; and that it is impossible to subtract all numbers in such a way, *e.g.*,

7	2	4
5	9	8

they will readily agree that:—

	7 hundreds	2 tens	4 units
is equal to	7 „	1 „	14 „
and also to	6 „	11 „	14 „
From which	5 „	9 „	8 „
Leaves	1 „	2 „	6 „

The sum may then be arranged in the ordinary way, and the same process gone through mentally

7	2	4
5	9	8
1	2	6

15. Make sentences showing how the same word is not always the same part of speech. Take as example the following words, and state in each sentence to what part of speech it belongs:—Long, near, but, that, rose, fly.

(*a*) 1. The exiles *long* for their native land (verb).
2. *Long* evenings were spent in study (adjective).
3. *Long* have I dreaded it (adverb).

(*b*) 1. '*Near* yonder copse,' etc. (preposition).
2. They sat *near* to us (adverb).
3. He was on the *near* side (adjective).

(*c*) 1. I shall go, *but* cannot return (conjunction).
2. They all came *but* one (preposition).
3. I had *but* just completed it (adverb).
4. 'There's not the smallest orb which thou beholdest
But in his motion like an angel sings' (rel. pro.).

(*d*) 1. 'The sheep *that* was lost is found' (relative pronoun).
2. This is mine, *that* is mine (demonstrative pronoun).
3. I said *that* he told you (conjunction).
4. *That* man is a rogue (demonstrative adjective).
5. T, h, a, t spells *that* (noun).

(*e*) 1. 'A *rose* by any other name would smell as sweet' (noun).
2. 'Ere that old man *rose* to go' (verb).

(*f*) 1. '— said the spider to the *fly*' (noun).
2. Swallows *fly* low (verb).
3. The eaglet learned *to fly* (gerundial infinitive).
4. They went *to fly* the kite (infinitive of purpose)

Say what use you think it right to make of 'tracing' in teaching writing. Write in large hand the five capital letters, B, K, Q, M, and W, and point out the commoner faults made by learners in forming them.

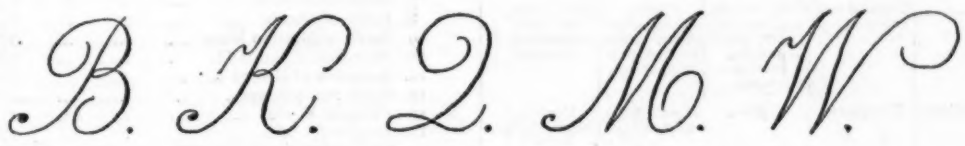
Its great advantage is that it gives confidence, and may be used:—

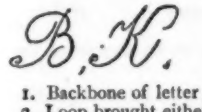
(*a*) 1. In teaching young children to form letters.
2. In introducing new elements, *e.g.*, *r* (r) *t* (t.)
3. In introducing a new style, *e.g.*, small-hand.
4. In correcting badly-formed letters, junctions, etc.

(This should be done over lead-pencil copy, set by teacher.)

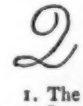
Note.—The practice of tracing should be *gradually* discontinued.

(*b*)





1. Backbone of letter sloped wrongly, or finished off badly.
2. Loop brought either above or below line, instead of on it; and letter, therefore, not properly balanced.
3. In B, the upper curve made larger than the lower.

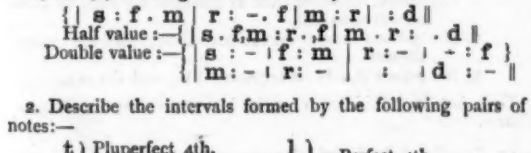


1. The top curve too small or bottom curve too large.
2. Stem of letter sloped wrongly.

1. First and third, second and fourth lines not parallel.
2. Introductory and final curve badly proportioned.

MUSIC.

1. Rewrite the following:—(1) halving the value of every note, and (2) doubling the value of every note and rest.

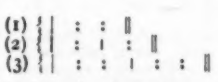


2. Describe the intervals formed by the following pairs of notes:—

t, f } Pluperfect 4th, or tritone. l, m } = Perfect 4th.

se, f } = Augmented 2nd.

4. Write the sign for (1) three-pulse measure, (2) four-pulse measure, (3) six-pulse measure. The pulses need not be filled with notes. Make all pulses equidistant.



6. Explain the following terms:—
(1) *Dal Segno* = repeat from the sign 𝄋.
(2) *Dolce* = in soft and sweet style.
(3) *Diminuendo* = becoming softer >.
(4) *Staccato* = distinct, detached, short. The notes separated by short rests.

Geography.

2. Distinguish physical and political geography, and explain the following terms:—

Physical Geography deals with the great natural features of the earth; its position as a member of the solar system; and the distribution of life over its surface.

Political Geography considers our planet as divided into states and countries, its trade, industries, etc.

Degrees of Latitude.—Latitude determines the distance north or south of the equator. One degree = $\frac{1}{360}$th of a great circle drawn through the poles.

West Longitude is the distance west of a line called the 'initial meridian,' which runs through the poles and a fixed point on the earth's surface. *We* take the meridian of Greenwich as 0. Other nations choose the meridian of their capital or some well-known observatory within their territory.

Tropic of Cancer.—(Greek, tropos = a turning.) This is a line drawn round the earth 23½° north, and parallel to, the equator. The most northerly point at which the sun can at any time be exactly vertical.

Watershed.—The slope from the water-parting to the bed of a river.

Delta.—The accumulated sediment brought down by a river and deposited at its mouth. It forms an alluvial tract of land, generally in the form of the Greek letter Δ, hence its name.

3. Describe a trip by steamer from London to Newcastle or Glasgow to Liverpool, with a sketch-map of the coast line, noting any remarkable feature on the coast.

London to Newcastle.—Leaving London we pass Tilbury, where Queen Elizabeth reviewed her troops, 1588, and turn north-west into the German Ocean, passing Shoeburyness and the flat, marshy coast of Essex, with its only headland, the Naze, on which stands Harwich, a packet station for Holland. The coast of Essex is famous for its oysters, that of Suffolk for its turbot. Ipswich, on the Orwell, was the birthplace of Cardinal Wolsey. Lowestoft Ness is the most easterly point of England. Yarmouth, at the mouth of the Yare, is the great seat of the herring fishery.

We now take a north-easterly course round the coast of Norfolk, where the sea is making rapid inroads; and pass the chalk cliff of Hunstanton, which terminates the East Anglian Heights. Passing the low sandy banks of the Wash to the Lincoln coast, upon which also the sea is encroaching—sighting 'Boston Stump' and the Lincoln Wolds—we reach the Humber, with Hull on the north and Grimsby on the south. On the north side of the estuary is Spurn Head, and from here to Flamborough Head the coast is also low and sandy. Flamborough Head is composed of chalk cliffs and terminates the Yorkshire Wolds.

We next have a view of Scarborough, Saltburn, and Redcar, favourite seaside resorts—Middlesborough, centre of the iron district—Stockton, a port on the Tees—Hartlepool and Sunderland, trading in coal; and, turning west, enter the Tyne, pass North and South Shields, and arrive at Newcastle, the first coal port in the kingdom, trading with London, France, the Baltic, and Mediterranean.

4.

Colony.	Climate.	Productions. Mineral.	Vegetable.	Animal.
India	Tropical and sub-tr opical.	Coal, iron, tin, copper, lead, salt, diamonds, precious stones.	Cotton, opium, indigo, sugar, coffee, linseed, pepper, spices.	Silk, ivory, lac, wool, cashmere shawls.
Cape Colony	Temperate	Copper.	Wheat, wine, fruit, aloes.	Horses, skins, wool, ostrich feathers.
Canada	Extreme.	Copper, lead, zinc, silver, gold, coal, marble, gypsum.	Timber, ashes, sugar, arrowroot.	Furs, fish, butter, wool, hides.
West Indies...	Tropical.	Cobalt, manganese, mineral earths.	Sugar, rum, coffee, cotton, timber, tobacco, spices, dyes, fruit, maize.	
Australia	Tropical and Sub-tropical.	Gold, copper, iron, coal, lead, silver.	Sugar, tobacco, indigo, cotton, arrow-root, wheat.	Wool, leather, fish, tallow, hides.
New Zealand	Temperate.	Gold, copper, iron, coal, lead, bismuth, nickel, petroleum, sulphur.	Flax, timber, gum, hops, olive, figs, tobacco.	Hides, wool, mutton.

5. Give a brief explanation of the following terms :—

(*a*) *Sahara* (Arabic, sára = a desert).—A desert, comprising all the immense region of North Africa between the Nile and the Atlantic: bounded on the north by the plateau of Barbary, and south by the Soudan. It has a diversified surface. On the north are sand heaps or 'dunes,' and in the interior are table-lands, called 'hammada,' strewn with sharp stones, and 'serir' covered with small pebbles. Oases are formed wherever water is present.

(*b*) *Deccan.*—The chief plateau of Hindostan. It stretches N. and S. between the Sautpoora Mountains and Neilgherries, and is bounded E. and W. by the Ghauts. It has no extent of forest; and in the hot season looks like a desert. At another time, however, it presents an unbroken sheet of green harvest.

(*c*) *Tibet*, the highest plateau in the world, lies to the N. of Hindostan. It is bounded: N. by the Kuen Lun, S. by the Himalaya Mountains. Its area is nearly eight times that of Great Britain, and its average height 15,000 feet above sea level. It is inhabited chiefly by nomadic tribes, whose wealth is in their long-hair shawl-wool goats and yak oxen.

(*d*) *Great Karroo.*—Karroo means arid or dry. The Great Karroo is the second great terrace of Cape Colony. In area it is about equal to Ireland; and is bounded on the N. by the Roggeveld and Nieuweld Ranges, and south by the Zwartebergen. It is utterly bare and barren, except after heavy rains, when it produces rich grass. It is divided into great sheep-runs, and is the main wool-yielding area of the Colony.

Gulf Stream.—This is a broad body of warm water, sweeping out of the Gulf of Mexico, through the Straits of Florida. It flows N. and N.E. across the Atlantic to the western shores of Britain and Norway. It is caused by the N.E. trade wind; which, by its constant blowing gives a westerly impulse to the inter-tropical surface waters of the Atlantic, and thus creates the current, which sets into the Gulf of Mexico.

History.

8. Arrange in chronological order, and give the dates of the following events:—The battles of Poitiers, Bannockburn, Pinkie, Marston Moor, Ashdown, and Evesham; the accession of Harold, George I., James II., and William Rufus; the passing of the Act of Catholic Relief; the transfer of the Government of India to the Crown; the South Sea Bubble, and the deaths of Wallace, Nelson, and Wolfe.

EVENT.	DATE.
1. Battle of Ashdown	871
2. Accession of Harold	1066
3. Accession of William II.	1087
4. Battle of Evesham...	1265
5. Death of Wallace	1305
6. Battle of Bannockburn	1314
7. Battle of Poitiers	1356
8. Battle of Pinkie	1547
9. Battle of Marston Moor	1644
10. Accession of James II.	1685
11. Accession of George I.	1714
12. South Sea Scheme...	1720
13. Death of Wolfe	1759
14. Death of Nelson	1805
15. Catholic Emancipation Bill	1829
16. Abolition of the East India Company ...	1858

9. Explain the following terms, and give an account of the second and fourth of these measures:—

(1) *Statute of Præmunire*, 1392.—This stated that all persons purchasing papal bulls were liable to outlawry and loss of property.

(2) *Petition of Right*, 1628.—It was drawn up by the third Parliament of Charles I. before voting supplies for the continuation of the war with Spain and France.

It declared the illegality of—

1. Taxes imposed without consent of Parliament.
2. Punishment of persons who refused to pay such tax.
3. Billeting of soldiers upon private subjects.
4. Punishment by martial law.

As soon as Charles had obtained the necessary money he broke the charter.

(3) *Five Mile Act*, 1665.—One of the laws of the Clarendon Code. It required all dissenting ministers to conform to the Church of England, and in case of refusal they were not to approach within five miles of any place where they had ever preached.

(4) *Habeas Corpus Act*, 1679.—Passed by the third Parliament of Charles II. Under former sovereigns persons might be imprisoned any length of time without being brought to trial. This Act provided:—

1. That all persons, except charged with treason or felony, must be tried at the next sessions, or else admitted to bail.
2. No person could be re committed for the same offence.
3. No person should be imprisoned beyond the sea.

This Act is considered next in importance to the Magna Charta.

12. Detail briefly the chief events of British history in the years 1688-89.

1688. The Revolution.

Causes.—1. Trial of the seven bishops.
2. Birth of the Old Pretender.
3. Designs of James to destroy Church of England.

William of Orange landed. James escaped to France. Peers and citizens requested William to call a Convention.

1689. Convention declared the throne vacant, and offered it to William and Mary. It also drew up the Declaration of Rights, afterwards embodied in the Bill of Rights, and signed by William.

First Mutiny Act passed. Toleration Act. Civil War in Ireland: Siege of Londonderry. Rising of Jacobites. Dundee gained the battle of Killiecrankie, but was mortally wounded.

13. Sketch briefly the career of the great Duke of Wellington.

Arthur Wellesley entered the army at the age of eighteen. Was made colonel. Took part in the Siege of Seringapatam, 1799. Defeated the Mahrattas at Assaye and Argaum, 1803. Fought in the Peninsular War, and gained the battles of Albuera, 1811; Salamanca, 1812; Vittoria, 1813; Toulouse, 1814. Drove the French out of Spain. Was made Duke of Wellington. Defeated Napoleon at Waterloo, 1815. Returned to England, was made Prime Minister, and passed the Catholic Relief Bill, 1829. Died 1852.

14. Write a short account of the Seven Years' war, and recite the principal terms of the Peace of Paris.

Prussia and England against Austria and France.

Causes.—1. Ambition of Frederick the Great.
2. Jealousy between English and French settlers.
3. Discovery of plot to ruin trade of Prussia.

(i.) *Europe.*—1757. Minorca lost. Admiral Byng shot.

1757. Defeat of Closterseven. Duke of Cumberland surrendered.

1759. Toulon Fleet defeated by Admiral Boscawen.
Brest Fleet defeated by Admiral Hawke.
Battle of Minden. Sackville defeated the French.

(ii.) *India.*—French settlers under Dupleix striving for authority

1752. Capture of Arcot by Clive.
1756. Calcutta seized by Suraj-ad-dowlah.
1757. Battle of Plassey gained by Clive.

(iii.) *North America.*—French endeavoured to unite their settlements by forts. Pitt's object was to gain Canada, and unite the colonies of B.N.A.

1759. Quebec taken by Wolfe, who was mortally wounded.
1760. Complete conquest of Canada.

Results of War.—Acquisition of Canada. Foundation of Indian Empire.

Treaty of Paris, 1760.

1. France ceded to England, Canada, Nova Scotia, C. Breton, Tobago, Dominica, St. Vincent, Granada, and Senegal.
2. Minorca was exchanged for Belleisle.
3. Spain exchanged Florida for Havanna.

This was opposed by Pitt as being inadequate to the money spent on the war.

Composition.

The advantages and disadvantages of town life as compared with life in the country.

Each has its advantages and disadvantages, and is liked and appreciated according to the different dispositions of human nature.

A town life is usually one of bustle and excitement. The strife for position, fame, and wealth, is keener and more prominent than in the country; though many of our noted writers have sent forth the instrument of their fame from its seclusion. For young, energetic folk who wish to make their way in the world, towns are undoubtedly the better; but these advantages are balanced by loss of physical, and often moral energy.

The faculties are preserved and the body strengthened by the repose and pure air of country life; but there is seldom the incentive to emulation and development of ability, that is found in a town. It may, therefore, lie dormant, and lose its power. Looking 'through Nature up to Nature's God,' the moral life should be strengthened, especially as there are fewer temptations to distract the mind.

To attain a full degree of moral, physical, and mental culture, it is desirable to be acquainted with life in both of these opposite phases.

	SENTENCE.				SUBJECT.		PREDICATE.			OBJECT.	
	Simple Sent.	Kind.	Relation.	Link.	Simple.	Enlargement.	Simple.	Extension.	Class of Extension.	Simple.	Enlargement.
(a)	Breathes there a man with soul so dead	Principal (Interrog.)			man	(*d*, *d*.) a, with soul so dead	breathes				
(b)	Who never to himself hath said,	Subordinate	Adjectival, attrib. to *a* (man)		who		hath said	to himself never	Manner Negation		
(c)	This is my own, my native land?	Subordinate	Noun, as obj. to 'said'		this		is = V. I. P. my own, my native land = *e*, *p*.				
(d)	Whose heart hath ne'er within him burned,	Subordinate	Adjectival to *a*, attrib. of man		heart	whose	hath burned	ne'er within him (*e*)	Negation Manner		
(e)	As home his footsteps he hath turned, from wandering in a foreign land?	Subordinate	Adverbial of time to (*d*), attrib. to 'hath burned'	as	he		hath turned	home from wandering in a foreign land	Place Manner	footsteps	his
(f)	If such there breathe,	Subord.	Adv. of condition to (*g*, *h*.)	if	such		breathe	there	Place		
(g)	Go,	Prin. Imper.			(thou)		go				
(h)	Mark him well;	Prin. Imper.			(thou)		mark	well	Manner	him	
(i)	For him no minstrel raptures swell!	Principal Exclamatory			raptures	no minstrel	swell	for him	Cause		

Parsing.

There—adv. of place, used provisionally, as 'it' is sometimes used.

(Adverbs modify verbs, adjectives, and other adverbs.)

so—adverb of degree, modifying 'dead.'

hath—auxiliary of the present perfect tense, governing 'said.'

said—past participle of the regular trans. verb 'to say,' gov. by 'hath.'

(Past part., and not past tense, after verbs 'have' and 'to be.')

hath } —compound, princ. verb, trans., act., indic. mood, present perfect tense, sing. numb., 3rd person, agreeing with 'who.'
said }

(Verbs must agree with their subject in numb. and person).

land—noun, common, neuter gender, sing. numb., 3rd pers., nominative case after 'is.'

(The verb 'to be' takes same case after as before it.)

whose—pronoun, relative, masc. gender, sing. numb, 3rd pers., possessive case, antecedent = man.

(Relative prons. must agree with their antecedent in gender, number, and person.)

wandering—gerund or verbal noun, neuter gend., sing. numb., 3rd person, objective case, gov. by 'from.'

(Nouns and their equivalents are gov. in the obj. case by transitive verbs and prepositions.)

breathe—verb, intrans., present imperf. tense, subjunctive mood, sing. numb., 3rd pers., agreeing with 'such.'

(The subjunctive mood takes the form of a sing. nominative and a plural verb.)

go—verb, irreg. strong, defective, intrans., imper. mood, present imperf. tense, sing. numb., 2nd person, nominative = thou understood.

(The subject of the imperative mood is generally implied.)

though—subordinate, adv. conjunction, linking the sentences, 'his titles be high,' 'the wretch shall forfeit,' etc.

wealth—noun, abstract, neuter gender, sing. numb., 3rd pers., nominative case to 'be' understood.

as—subordinate adv. conjunction, introducing sent., 'as wish can claim.'

despite—preposition, gov. objective case of titles, power, pelf, and relating those words to 'shall forfeit.'

pelf—noun, abstract, neuter gend., sing. numb., 3rd pers., objective case, gov. by 'despite.'

all—adverb of manner, modifying 'concentred,'

go—verb, irreg. strong, defec. intrans., present imperf. tense, infin. mood, gov. by 'shall.'

(The aux. verbs—may, can, shall, etc., gov. the infin. mood.)

shall } —compound principal verb, intrans., indic. mood,
go } future tense, sing., 3rd, nom. = 'wretch.'

whence—noun, common, neuter gend., sing. numb., 3rd per., objective case, gov. by 'from.'

sprung—verb, irreg. strong, intrans., indic. mood, past imperf. tense, sing. numb., 3rd per., nom. = 'he.'

unsung—past participle of the irreg. verb to 'unsing,' used attributively to 'wretch.'

(Participles are used predicatively and attributively.)

Paraphrase.

Is there any man living, whose heart is so devoid of feeling, that it has never been stirred by patriotism; or who has not felt a glow of delight as he neared his native land? If such a man does exist, take good heed of him; you will never find that he is famous or beloved.

4. Examine the etymology of any five of the following words:—Own, native, whose, heart, foreign, minstrel, raptures, titles, boundless, claim, wretch, concentred, forfeit, renown.

(1) *Native.*
L. nativus = belonging to one born } = produced by nature.

(2) *Titles.*
L. tituius = a name } = names.

(3) *Boundless.*
A. S. bound = a limit
,, less = without } = without a limit.

(4) *Concentred.*
L. con = together
L. centrum = a centre } = met in a common centre.

(5) *Renown.*
L. re = back or again
L. nomen = a name } ∴ = celebrity.

5. Distinguish the following:—

A common noun is a name which may be given to any one out of a class of things.

A proper noun is the particular name of any person, place, animal, or thing.

An abstract noun is the name of an idea. Properly speaking, the name of a quality or idea abstracted from the thing or object.

Cardinal numbers denote quantity by indicating how many persons or things are spoken of. They are the conventional names of the figures.

Ordinal numbers denote the order of succession by indicating some relation borne to other persons or things, *e.g.*, first, second.

An intransitive verb } Modern grammarians accept these
A neuter verb } terms as synonymous.
Is one which denotes a state or condition, action, or feeling which is not directed towards any object.

A continuative conjunction is one which, while connecting words, also combines their meaning, *e.g.*, 'It began to rain *before* I started.'

A disjunctive conjunction is one which joins the words but disconnects the meaning, *e.g.*, Sing *or* dance.

A personal pronoun is one which stands for some person speaking, spoken to, or spoken of, *e.g.*, *I, thou, he.*

A possessive pronoun is one used when the noun to which it relates is not expressed, *e.g.*, My book is lost, lend me *yours.*

A reflexive pronoun is one used when the action directly or indirectly affects the doer of it, *e.g.*, He killed *himself.*

A relative pronoun is one which relates to some noun or pronoun gone before, and called its antecedent.

It also serves to connect clauses and sentences one with another.

6. It is often said that English is less of an inflected language in its later than in its earlier stages. Explain what is meant by this, and give a few instances of inflection in English as now spoken.

Inflection is the change of form which words undergo in order to express different relations. English was a synthetic or highly inflected language down to the end of the eleventh century. Since then it has been becoming more and more of an analytic language.

In nouns there were three declensions and five cases.

The definite article was inflected.

Adjectives agreed with the nouns they qualified in gender, number, and case, and varied their form to denote this.

If we take a modern word, we find that it shows its various relations by the employment of auxiliaries (*e.g.*, verbs) instead of by internal change.

Some inflections, at the present day, are as follows:—

(*a*) In nouns; 's for the possessive case.

(*b*) In the pronouns the old inflections are most clearly shown; *e.g.*, '*m*' in '*him*,' '*them*' (dative); '*s*' in '*his*' (genitive), etc.

(*c*) In the auxiliary verbs we have fragments of O. E. verb inflections.

7. Show by examples how analysis helps to parse correctly.

Before parsing a word it is necessary to ascertain what duty it is doing in the sentence to which it belongs.

Many words can be various parts of speech according to the relation in which they stand to others.

In parsing the sentences, (*a*) 'To err is human, to forgive divine,' (*b*) 'The knocking was distinctly heard,' if we know that the subject of a sentence is always a noun or its equivalent in the nominative case, it will be clearly understood that 'to err' and 'to forgive' are gerundial infinitives and 'knocking' a verbal noun. Without this knowledge, the words, from their form, would be taken as verbs. In this way all other parts of speech are determined, and, strictly speaking, no sentence can be parsed without first having been analysed.

8. At what periods, and in connection with what events in the history of this island, did the most important changes take place in the language of the inhabitants? Illustrate your answer.

449. Saxon.—Landing of Hengist and Horsa.

(*a*) *Names of places and natural features*, *e.g.*, Thames, Esk, Avon, Derwent, etc.

(*b*) *Names of common things*—Barrow (a burying place), cradle, crockery, clout, basket, bran, darn.

787. Scandinavian.—Hardly to be distinguished from Saxon, because from the same group.

(*a*) *Names of places—e.g.*, by (town), Whitby; fell (a hill), Scawfell; ness (a cape), Sheerness,

(*b*) *Names of common things—e.g.*, aren (arc), talk, fellow, sky, odd, blunt.

43-426. FIRST PERIOD OF LATIN.—The Roman occupation. Strata (street), castra (camp), vallum (wall), portus (a harbour), fossa (a ditch), colonia (settlement).

596. SECOND PERIOD OF LATIN.—St. Augustine introduced Christianity.

(*a*) Church terms—Clerc (scholar), diacon (deacon), sanctus (saint), pondus (pound), uncia, a small division (inch, ounce).

1066. THIRD PERIOD OF LATIN.—Norman Conquest.

Language of Court, Church, law, *e.g.*, realm, chivalry, fealty, friar, judge, parliament.

1349. Boys no longer learnt Latin through French.

1362. Edward III. Laws written in English for the first time.

1509. FOURTH PERIOD OF LATIN.—Revival of learning. End of the Dark Ages.

1453. Turks took Constantinople. The Greeks fled, and carried their rich store of literature to all parts of Europe. Great importation of words suffering little or no change from their Latin form, *e g.*, opinio (opinion), separatum (separate).

Domestic Economy.

SECTION I.

2. Give directions suitable to a class of younger children, for the following :—

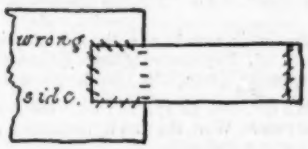
(*a*) SEWING ON A STRING.

(1) Turn down one end of tape and fix it on the wrong side of garment, as far from the edge as the width of the tape.

(2) Hem the three sides of tape.

(3) Turn tape back and seam edge of garment to folded part of tape. Fasten off.

(4) Take the opposite end of tape, turn a narrow hem on wrong side. Hem and neatly sew up corners.

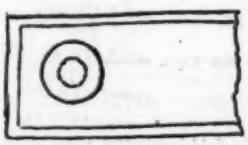


(*b*) SEWING ON A BUTTON.

(1) Carefully prick a ring in the button half way between edge and centre.

(2) To fasten on, slip needle between folds of band. Stitch a small circle in marks already made. Do not draw the cotton tight.

(3) Bring needle out between button and band. Twist cotton round about six times to stem the button. Fasten off on wrong side.



(*c*) KNITTING A PAIR OF PLAIN MUFFATEES (two needles).

(1) Cast on 48 stitches, thus :—Knit one, pass newly-made stitch on to first needle.

(2) Knit the required length in the following manner :—Knit 2, pass wool to front, purl 2, pass wool back. Slip first stitch of every row to make chain edge.

(3) To cast off, knit two stitches, pass first stitch over second, repeat till only one stitch remains.

(4) Draw this out, break off, leaving end sufficient to sew up cuff.

(5) With this, thread a worsted needle and sew up cuff; carefully darning in the end on wrong side.

II.—2. What mode of investing her future savings do you consider the best for a young woman entering on the career of a schoolmistress? State what you know respecting some of the methods of investment now available for small savings.

(*a*) (1) Post-office savings bank.
(2) Purchase of an annuity.
(3) Building society.
(4) Compulsory pension scheme, as in Government offices.

(*b*) (1) P. O. S. B. gives interest of 2½ per cent. Not more than £30 may be deposited in one year, and nothing more than £150. No charge for postage. Absolute secrecy secured. Payment made or money withdrawn at any office in the U.K. Perfectly safe.

(2) ANNUITIES.—(*a*) *Immediate.* (*b*) *Deferred.*—

(*a*) Money may be paid down at once and annuity bought which will commence immediately.

(*b*) May be purchased in the P.O.S.B. up to £50. This is much more advantageous than saving—*e.g.*, A woman at thirty puts by £1 17s. 6d. annually for thirty years. She then has £56 5s., which will serve her at rate of £10 a year for 5¾ years only. If this is invested, she has an annuity of £10.

(3) BUILDING SOCIETIES.—These are safe and profitable, if properly managed. Shares are purchased by weekly or monthly instalments. Society then lends money without interest for the purchase of land or houses. Repayment of loan extends over a stated number of years.

(4) LIFE INSURANCE.—This is a means of providing a fund for use of a family at the death of its head. Life may be insured at the P.O. for sums not less than £20 and not more than £100. The earlier in life the less premium is required.

(5) STOCK.—Origin, the National Debt. Repayment of loan cannot be claimed, but right to receive interest can be bought and sold. Price of stock varies, and there is risk of realising in selling again.

(6) CO-OPERATIVE SOCIETIES.—These are formed by amateur tradesmen, with capitals, who put them together, and pay a manager to conduct a business for them. The books are inspected and profits divided periodically amongst shareholders.

III.—2. Mention the necessary ingredients of nourishing food and the special purposes served by each. Compare the advantages and defects of the following :—(*a*) Fish ; (*b*) Lean beef ; (*c*) Cheese ; (*d*) Potatoes.

To keep the body in health, food must consist of the elements of the body, *i.e.*, C, O, H, N.

Foods are divided into two great classes, viz. :—

(1) NITROGENOUS FOODS, or those containing the four elements C, O, H, N. The nitrogen in these forms flesh and tissue.

(2) NON-NITROGENOUS FOODS, or those containing only C, O, and H. They are used in the process of breathing, produce heat, and form fat. The inorganic foods of this class are employed in the formation of bone and purification of blood.

	ADVANTAGES.	DEFECTS.
Fish	Flesh-forming, light and nourishing ; supplies phosphorus to the brain.	Deficient in warmth-giving power. Does not contain sufficient support for those engaged in physical labour.
Lean beef ...	It is rich in nitrogen (fibrin, albumen), very suitable to bodily labour.	Deficient in fat and warmth-giving power, and difficult of digestion.
Cheese	It is rich in nitrogen (caseine). Best suited to robust, hard workers.	Very indigestible. Hard cheese deficient in fat.
Potato	Contains a large amount of starch, also salts. Gives warmth.	Is very indigestible, and not nourishing. One pound peas equal to three pounds potatoes.

IV. 1.—Mention some of the most wholesome and economical modes of cooking meat, and specify the time required for each. How may the juices of meat be best preserved? What uses can be made of dripping?

(*a*) (1) *Roasting* is the most wholesome, but is not economical, as it is only suited to prime joints. It requires 15 minutes for every lb. of meat and 15 minutes over.

(2) *Boiling* is very wholesome and economical. Many joints can only be made nourishing in this way. Requires 20 minutes to each lb. and 20 minutes over.

(3) *Frying and Grilling.* These are simple, quick, and wholesome if properly done ; but only suited to small cuts.

(4) *Stewing* is the most economical and best method of cooking meat if it be sinewy or tough. The meat is rendered

digestible and there is no waste whatever. It requires care and time; should simmer several hours.

(*b*) To preserve the juices in the meat:

(1) *In roasting*, put the joint immediately in front of a bright fire, so that the outer albumen may become hardened, and keep in the juices. The joint should then be drawn back.

(2) *In boiling*, plunge the meat into boiling water, for a similar reason.

To extract the juices from the meat:

(1) *In boiling*, place meat in cold water and let it gradually come to boiling point, and simmer gently. This dissolves the albumen.

(2) *In stewing*, the most effectual way is to place the meat in a covered jar, inside a saucepan containing water, and allow to simmer.

(*c*) Dripping may be used:

(1) For pastry instead of lard or butter.

(2) To supply the deficiency of fat in puddings made with skim milk.

(3) To supply fat in soups made largely or entirely of vegetables.

(4) For poor people it is cheaper and better than much of the so-called 'butter.'

V. 2.—Name and describe the early symptoms of some of the most common contagious and infectious diseases. What are the cheapest and most efficacious disinfectants?

(*a*) I. *Measles*:

(1) Severe cold.

(2) Eruption on fourth day in patches of dark raspberry colour.

II. *Scarlet Fever*:

(1) Feverishness, throat affection.

(2) Eruption on second day—universal—bright scarlet.

III. *Croup*:

(1) Cough similar to bark of dog.

(2) Hoarseness and difficulty in breathing.

IV. *Small Pox*:

(1) Feverishness, sickness, pains in the back.

(2) Fourth day—eruption on face, extending, in form of pimples or pustules, which burst on the eighth day.

V. *All Fevers*:

Shivering, quick pulse, thirst, heated skin, throbbing in head.

(*b*) *Disinfectants*:

I. *Chloride of Lime* (chlorine gas). It is cheap, powerful, and quick in action, but weakens fabrics, destroys colour, and has a strong smell.

II. *Charcoal* has no disagreeable smell and is cheap. It reduces noxious gases to their simplest form. The fumes cause death. It arrests putrefaction.

III. *Sulphur* is used for fumigating empty rooms. The fumes are suffocating. It destroys colour.

IV. *An excellent disinfectant*—2 oz. sugar of lead + 2 oz. aqua fortis (poison). It is cheap and strong.

V. *Condy's Fluid* is largely composed of permanganate of potash. Gives off oxygen in a nascent form. Stains.

VI. *Carbolic acid and powder*.

VI.—2. What are the chief precautions to be observed in the selection of materials for clothing? Show by a statement of particulars what would be the probable cost of a suitable winter outfit for a pupil-teacher.

(*a*) (1) Cotton goods should have no stiffening. Threads should be even and regular and selvedge good.

(2) Woollen goods should be soft, smooth, fine, and not mixed with cotton (ascertain by fraying the edge).

(3) Silk should be heavy, and have a bright coloured border.

(4) All patterns should be regular.

(5) Colours should be suitable to wearer, and harmonise with other articles of apparel.

(6) Preference should be given to quality, rather than quantity. Common things are always dearest in the end.

	£	s.	d.
Two useful woollen dresses	2	0	0
One jacket	1	0	0
One ulster or macintosh...	1	0	0
Two warm hats	0	10	0
Two pair boots	1	0	0
One umbrella	0	7	0
Two pair of warm gloves	0	3	6
Two pair of knitted stockings	0	3	0
Flannel underclothing, about 6 yards at 1s. 1d. ...	0	6	6
	£6	10	0

Note.—It is supposed that it would only be necessary to supplement that which remained from the outfit for previous year.

Arithmetic.

1. Explain the meaning of these arithmetical terms, and give an example of each:—

(1) *Multiple.*—A number is called a multiple of another, when the former is equally divisible by the latter, *e.g.*, 12 is a multiple of 3.

(2) *Common Measure.*—A common measure of two or more numbers, is a number which will divide each of them an exact number of times, *e.g.*, 8 is a C.M. of 32, 96, 112.

(3) *Ratio.*—If A and B be quantities *of the same kind*, the relative greatness of A with regard to B, is said to be the ratio of A to B., *e.g.*,

A = £5 : B = £10. ∴ The ratio is 1 : 2.

(4) *Proportion.*—This is the equality of ratio. It consists of four terms. If A, B, C, D, are in proportion, then the ratio of A and B equals that of C D, *e.g.*,

A = £5 : B = 10 : C = £15 : D = £30. ∴ A : B :: C : D.

(5) *Compound Interest.*—It is that form in which the interest is annually added to the last principal, thus making a fresh principal each year; *e.g.*,

Comp. Int. on £100 for 2 years at 5 per cent.,

1st Principal = £100

1st Interest = $£\left(\frac{100\times5}{100}\right) = £5$

2nd Principal = £100 + £5 = £105

2nd Interest = $£\left(\frac{105\times5}{100}\right) = £5\frac{1}{4}$

∴ Total Interest = £5 + £5¼ = £10 5s.

(6) *Discount.*—This is the abatement made when a sum of money is paid before it is due. It is the interest on the present worth;

e.g., £205 due in six months at a discount of 5 per cent.

= £200. ∴ Discount = £205 − £200 = £5,

which is the interest on £200 (P.W.) for the given time.

2. If 73 yards 2 qrs. cost £2 17s. 2d., what will 6 yards 3 qrs. cost at the same rate? Work the sum by proportion and method of unity.

(*a*) As 73½ yds. : 6¼ yds. :: £2 17s. 2d. : *x*.

20
57
12
686

$x = £\left(\frac{27\times2\times686}{4\times147\times12}\right) = \frac{21s.}{4} = 5s.\ 3d.$

(*b*) *Cost* of 73 yds. 2 qrs. = £2 17s. 2d.

" 1 yd. = £2 17s. 2d. / 73½

" 6 yds. 3 qrs. = £2 17s. 2d. × 6¼ / 73½

$= £\left(\frac{27\times2\times686}{4\times147\times12}\right) = 5s.\ 3d.$

3. One-fifth of a field is meadow, three-eighths are arable, and the remainder is 1 a. 3 r. 26 p. Find the area of the meadow and arable parts respectively.

Let unity = the whole.

⅕ = meadow, ⅜ = arable } ∴ 1 − (⅕ + ⅜) = remainder

$= 1 - \left(\frac{8+15}{40}\right) = \frac{17}{40}$ "

$\frac{17}{40}$ = meadow : $\frac{11}{40}$ = arable : $\frac{17}{40}$ = 1 a. 3 r. 26 p.

∴ Meadow

= As 17 : 8 :: 1 a. 3 r. 26 p. : *x*

$x = \text{poles}\left(\frac{8\times306}{17}\right) = 144 \text{ p.} = 3 \text{ r. } 24 \text{ p.}$ Ans.

∴ Arable

= As 17 : 15 :: 1 a. 3 r. 26 p. : *x*

$x = \text{poles}\left(\frac{15\times306}{17}\right) = 270 \text{ p.} = 1 \text{ a. } 2 \text{ r. } 30 \text{ p.}$ Ans.

4. What is the value of a gold cup weighing 9 oz. 8 dwt, 19 grs., when gold is worth £3 17s. 10½d. per oz.?

£	s.	d.			
3	17	$10\frac{1}{2}$	= price of	1	oz.
	9				
35	0	$10\frac{1}{2}$	= ,,	9	oz.
0	15	$6\frac{1}{2}$	= ,,	4	dwt.
0	15	$6\frac{1}{2}$	= ,,	4	dwt.
0	1	$11\frac{29}{40}$	= ,,	12	grs.
0	0	$11\frac{149}{160}$	= ,,	6	grs.
0	0	$1\frac{593}{960}$	= ,,	1	gr.
£36	15	$1\frac{593}{960}$	= ,,	9 oz. 8 dwt. 19 grs.	

4 dwt. = $\frac{1}{5}$ of 1 oz.
4 ,, = ,, ,,
12 grs. = $\frac{1}{2}$ of 4 dwt.
6 ,, = $\frac{1}{2}$,, 12 grs.
1 ,, = $\frac{1}{4}$,, 6 ,,

6. If I gain 20 per cent. by selling tea at 6s. 8d. how much is gained per cent. by selling it at 7s. 6d.?

Let 100 = cost price
then 6s. 8d. = cost price + 20 p.c. = 120
∴ As 6s. 8d. : 7s. 6d. :: 120 : x

$$x = \left(\frac{90 \times 120}{80}\right) = 135$$

∴ 135 − 100 (cost price) = 35 = gain per cent. Ans.

7. Work by practice the following question, and show what is the value of each line of figures. What is the price of 3 cwt. 2 qrs. 16 lbs. at £3 7s. 8d. per cwt.?

£	s.	d.			
3	7	8	= price of	1	cwt.
	3				
10	3	0	= ,,	3	cwt.
1	13	10	= ,,	2	qrs.
0	8	$5\frac{1}{2}$	= ,,	14	lb.
0	1	$2\frac{1}{2}$	= ,,	2	lb.
£12	6	6	= ,,	3 cwt. 2 qrs. 16 lb.	

2 qrs. = $\frac{1}{2}$ of 1 cwt.
14 lb. = $\frac{1}{2}$ of 2 qrs.
2 lb. = $\frac{1}{7}$ of 14 lbs.

8. Explain when and why it is necessary to reduce fractions to a common denominator. Give the rule, and show reason, taking as examples, $\frac{3}{10}$, $\frac{5}{7}$, $\frac{4}{5}$, $\frac{7}{8}$.

(*a*) In addition, subtraction, and comparison of fractions.

(*b*) Common denominator = same name. None but quantities of the same name can be added or subtracted, *e.g.*, if we wish to plus half-crowns, florins, pence, etc., we must first bring them to a common denominator, *i.e.*, £ s. d.

Rule.—Find L. C. M. of denominators = new denominator; then L. C. M. ÷ denominator and × numerator of each fraction = new numerators.

2) 12, 7, 5, 8
2) 6, 7, 5, 4
3, 7, 5, 2 = L. C. M. = 840

350, 360, 672, 735
840

9. If one buys 125 yards of cloth at rate of 2 yards for 5s., and 125 yards at the rate of 3 yards for 5s., what will he gain or lose by selling the whole at 5 yards for 10s.?

	£	s.	d.
Cost of 125 yards at 2 yards for 5s.	= 15	12	6
,, ,, 3 ,, 5s.	= 10	8	4
∴ Total cost	= 26	0	10
Amount on selling 250 yards at 5 yards for 10s. ...	= 25	0	0
Answer ∴ = loss of	£1	0	10

11. If in 4 years £537 16s. 8d. amounts to £591 12s. 4d., what is the rate of interest per cent.?

	£	s.	d.
Amount =	591	12	4
Principal =	537	16	8
∴ Interest =	53	15	8

$$\text{Interest} = \frac{P \times R \times T}{100}$$

Interest on £537 16s. 8d. for 4 years at 1 per cent.

$$= £\left(\frac{3227 \times 4 \times 1}{6 \times 100}\right) = £\frac{3227}{150}.$$

∴ As $£\frac{3227}{150}$: £53 15s. 8d. :: 1 p.c. : x

$$x = \text{p.c.}\left(\frac{12908 \times 150 \times 1}{20 \times 12 \times 3227}\right) = \frac{5}{2} = 2\tfrac{1}{2} \text{ per cent. Ans.}$$

12. Convert $\frac{5}{41}$, $\frac{4}{13}$, and $\frac{8}{53}$ into recurring decimals, and find, by simple inspection, the vulgar fractions equivalents to the recurring decimals $\cdot\dot{5}$, $\cdot\dot{0}2\dot{7}$, $\cdot\dot{5}3\dot{4}$, $\cdot\dot{4}26\dot{3}$.

41) 5·00000 (·12195
13) 4·000000 (·307692
53) 8·0000000000000 (·150943396226

$\cdot\dot{5} = \frac{5}{9}$ $\quad \cdot\dot{0}2\dot{7} = \frac{27}{999} = \frac{1}{37}$
$\cdot 534 = \frac{534}{999} = \frac{178}{333}$ $\quad \cdot 4263 = \frac{4263}{9999} = \frac{1421}{3333}$

13. A corn factor bought 160 quarters of wheat at 41s. 3d. per quarter, and sold it at 58s. 4d. What did he gain, and at what price ought it to have been sold to gain £33?

(*a*) Selling price = 160 × 58s. 4d. = £466 13s. 4d.
Cost ,, = 160 × 41s. 3d. = £330
Gain on 160 qrs. = £136 13s. 4d.

(*b*) Cost price of 160 quarters = £330
£33
Selling price to gain £33 = £363
∴ As £330 : £363 :: £2 1s. 3d. : x.

$$x = £\left(\frac{363 \times 165}{4 \times 330}\right) = £2\ 5s.\ 4\tfrac{1}{2}d.$$

15. Give a rule for working mentally the following problems, and illustrate each by an example:—

(*a*) To find the price of a score:—Call shillings pounds = price of 1 score.

Then multiply by the specified number of scores; *e.g.*, 3 score at 5s. each.

1 score at 5s. each = £5
3 ,, ,, ,, = £15.

(*b*) To multiply by 99:—Add on two ciphers, and from this result subtract once the given number.

e.g., 586 × 99 = 58600 − 586 = 58014.

(*c*) To multiply by $2\frac{1}{2}$:—Place one cipher after the given number, and divide result by 4.

e.g., 976 × $2\frac{1}{2}$ = 9760 ÷ 4 = 2440.

(*d*) To find the interest at 5 per cent. for a month:—Call pounds pence.

e.g., £600 for 1 mo. at 5 per cent. = 600 pence = £2 10s.

Penmanship.

Interrogation.

Then burst from that great concourse,
A shout that shook the towers.

Query Column.

RULES.

1. Each correspondent is restricted to *one question.* We should be much obliged if correspondents, who send questions for solution, would give (if possible) the required answer, and the source from which the question is obtained.

2. No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.

3. ☞ When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.

4. Correspondents are requested to write their queries *legibly*, and on one side of the paper only.

5. Replies will not be sent through the post.

6. Queries must reach the office *not later than the 12th of the month*, or they cannot be attended to in the following issue.

*** All communications for this column should be addressed—'*The Query Editor*,' *The Practical Teacher, Pilgrim Street, Ludgate Hill, London, E.C.*

Algebra.

1. FOLKESTONIAN.—If I gain every year 50 per cent. on my capital, of which I spend £300 per annum, and at the end of 4 years I find I have capital 4 times as great as that I had at the beginning; what was my original capital?

Let x = Original capital in pounds;

Then,

Amount in pounds at end of 1st year $= \frac{3x}{2} - 300$

$= \frac{3x - 600}{2}$;

" " " 2nd " $= \frac{3}{2}\left(\frac{3x-600}{2}\right) - 300$

$= \frac{9x - 1800}{4} - 300$

$= \frac{9x - 3000}{4}$;

" " " 3rd " $= \frac{3}{2}\left(\frac{9x-3000}{4}\right) - 300$

$= \frac{27x - 9000}{8} - 300$

$= \frac{27x - 11400}{8}$;

" " " 4th " $= \frac{3}{2}\left(\frac{27x-11400}{8}\right) - 300$

$= \frac{81x - 34200}{16} - 300$

$= \frac{81x - 39000}{16}$;

$\therefore \frac{81x - 39000}{16} = 4x$

$81x - 39000 = 64x$

$81x - 64x = 39000$

$17x = 39000$

$\therefore x = 2294\frac{2}{17}$.

$\therefore$ Original capital $= £2,294\frac{2}{17}$. Ans.

2. IGNORAMUS.—Find two numbers such that the square of the first added to the second equals 151, and the square of the second added to the first equals 61. (*Murby.*)

Let x and y represent the numbers;

Then, $\left.\begin{matrix}(1)\ x^2+y=151\\(2)\ y^2+x=61\end{matrix}\right\}$

From (1) $\quad y = 151 - x^2$;

$\therefore$ (2) $\quad (151-x^2)^2 + x = 61$

$22801 - 302x^2 + x^4 + x = 61$

$x^4 - 302x^2 + x + 22801 - 61 = 0$

$x^4 - 302x^2 + x + 22740 = 0$

$(x-12)(x^3+12x^2-158x-1895) = 0$;

If, $x - 12 = 0$, then $x = 12$;

If, $x^3 + 12x^2 - 158x - 1895 = 0$, we have a cubic equation which does not give integral solutions.

$\therefore$ The only integral solution is:—

$x = 12$, and $y = 151 - x^2 = 151 - 144 = 7$.

3. W. LANE.—Find the G. C. M. of:—

$3a^3x - ax^2 + abx - 3a^2b + bx - b^2$ and

$5a^4x + 2a^3x^2 - 3ab^2x - 5a^2b - 2a^2bx + 3b^3$. (*Senior.*)

$3a^3x - ax^2 + abx - 3a^2b + bx - b^2$

$= 3a^3x - 3a^2b + abx - b^2 - ax^2 + bx$

$= 3a^2(ax-b) + b(ax-b) - x(ax-b)$

$= (ax-b)(3a^2+b-x)$.

$5a^4x + 2a^3x^2 - 3ab^2x - 5a^2b - 2a^2bx + 3b^3$

$= 5a^4x - 5a^2b - 3ab^2x + 3b^3 + 2a^3x^2 - 2a^2bx$

$= 5a^2(ax-b) - 3b^2(ax-b) - 2a^2x(ax-b)$

$= (ax-b)(5a^2 - 3b^2 + 2a^2x)$.

$\therefore$ G. C. M. $= ax - b$. Ans.

Note.—It *must* be worked by factors.

4. J. W. DUCK.—How many permutations can be formed out of 20 things taken 4 at a time? (*Hamblin Smith.*)

No. of permutations $= 20(20-1)(20-2)(20-3)$

$= 20.19.18.17$

$= 116,280$. Ans.

Arithmetic.

1. HAL.—A person buys 4 cwt. of goods for £15 intending to gain 12 per cent. by the sale, but a guinea's worth (at this calculation) being damaged, at what price should he sell per cwt. to gain as much upon his whole outlay as he intended?

Selling price $= £15 + 12$ per cent. on £15

$= £15 + £1\ 16s.$

$= £16\ 16s.$;

$\therefore$ Selling price per cwt. $= £16\ 16s. \div (4 - \frac{1}{16}$ of $4)$

$= £16\ 16s. \div 3\frac{3}{4}$

$= £16\ 16s. \times \frac{4}{15}$

$= £5\ 12s. \times \frac{4}{5}$

$= £22\ 8s. \div 5$

$= £4\ 9s.\ 7\frac{1}{2}d.$ Ans.

2. BLADENSBURG.—Express the G.C. Measure of $\frac{3}{7}$, $\frac{4}{11}$, $\frac{2}{11}$, $\frac{3}{11}$, as the fraction of the L.C. Multiple of the same fractions, and give the rules for finding the G.C.M. and L.C.M. of fractions. (*Military Examination.*)

$\frac{3}{7}, \frac{4}{11}, \frac{2}{11}, \frac{3}{11}$;

G C.M. of Numerators $= 1$
L.C.M. of Denominators $= 42$ $\Big\}$ $\therefore$ G.C.M. $= \frac{1}{11}$;

L.C.M. of Numerators $= 60$
G.C.M. of Denominators $= 7$ $\Big\}$ $\therefore$ L.C.M. $= \frac{60}{7}$;

$\therefore$ Fraction $= \frac{\frac{1}{11} \times 6}{\frac{60}{7}}$

$= \frac{1}{11} \times \frac{7}{60}$.

Rule for G.C.M. $= \frac{\text{G.C.M. of Numerators}}{\text{L.C.M. of Denominators}}$.

Rule for L.C.M. $= \frac{\text{L.C.M. of Numerators}}{\text{G.C.M. of Denominators}}$.

3. G. W. JONES.—Two persons, A and B, are on the opposite sides of a wood, which is 536 yards in circumference; they begin to travel in the same direction at the same moment; A goes at the rate of 11 yards per minute, and B goes at the rate of 34 yards in 3 minutes; how many times must the quicker one go round the wood before he overtakes the slower?

While B goes 34 yards, A goes 33 yards;
∴ B gains 1 yard in 34 yards;
B must go $\left(\frac{536}{2}\times 34\right)$ yards to overtake A;
∴ No. of times $=(536\times 17)\div 536$
$=17$. Ans.

See Rule 1, Query Column.

4. PUZZLED.—By selling 6 apples and 2 pears for a shilling I gain $33\frac{1}{3}\%$; but if I sell 6 pears and 2 apples for a shilling, I lose $12\frac{8}{41}\%$. Find the cost price per dozen of the apples and pears.

(1) (Cost of 6 apples + cost of 2 pairs) $\times\frac{100+33\frac{1}{3}}{100}=12$d.

(2) (Cost of 2 apples + cost of 6 pears) $\times\frac{100-12\frac{8}{41}}{100}=12$d.

(1) (Cost of 6 apples + cost of 2 pears) $\times\frac{4}{3}$ $=12$d.
(2) (Cost of 2 apples + cost of 6 pears) $\times\frac{41}{33}$ $=12$d.
(1) Cost of 6 apples + cost of 2 pears $=12\text{d.}\times\frac{3}{4}$
$=9$d.
(2) Cost of 2 apples + cost of 6 pears $=12\text{d.}\times\frac{41}{33}$
$=\frac{41}{3}$d.
(1) Cost of 6 apples + cost of 2 pears $=9$d.
(2) Cost of 6 apples + cost of 18 pears $=41$d.
∴ Cost of (18 − 2) pears $=(41-9)$d.,
Cost of 16 pears $=32$d.,
∴ Cost of a pear $=2$d.

(1) Cost of 6 apples + cost of 2 pears $=9$d.
Cost of 6 apples $+4$d. $=9$d.
Cost of 6 apples $=5$d.
∴ Cost of the apples per dozen $=10$d.
Cost of the pears per dozen $=2$s. } Ans.

General.

1. GENTIL.—You will find the solution of your query in our issue for December, 1884.

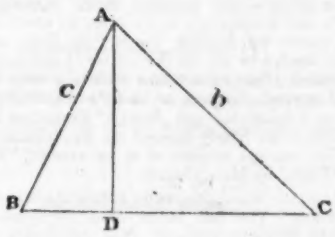
2. W. R.—To find $\sin\alpha$, and $\cos\alpha$, if $\tan\alpha=\frac{m\sin\omega}{1+m\cos\omega}$.

$$\text{Tan }\alpha=\frac{m\sin\omega}{1+m\cos\omega}$$
$$\frac{\sin\alpha}{\cos\alpha}=\frac{m\sin\omega}{1+m\cos\omega}$$
$$\frac{\sin^2\alpha}{\cos^2\alpha}=\frac{m^2\sin^2\omega}{1+2m\cos\omega+m^2\cos^2\omega}$$
$$\frac{\sin^2\alpha}{1-\sin^2\alpha}=\frac{m^2\sin^2\omega}{1+2m\cos\omega+m^2(1-\sin^2\omega)}$$
$$\frac{\sin^2\alpha}{1-\sin^2\alpha+\sin^2\alpha}=\frac{m^2\sin^2\omega}{1+2m\cos\omega+m^2-m^2\sin^2\omega+m^2\sin^2\omega}$$
$$\frac{\sin^2\alpha}{1}=\frac{m^2\sin^2\omega}{1+2m\cos\omega+m^2}$$
$$\therefore\ \sin\alpha=\frac{m\sin\omega}{\pm\sqrt{1+2m\cos\omega+m^2}}.$$
$$\sin^2\alpha=\frac{m^2\sin^2\omega}{1+2m\cos\omega+m^2}.$$
$$1-\cos^2\alpha=\frac{m^2(1-\cos^2\omega)}{1+2m\cos\omega+m^2}$$
$$\cos^2\alpha=1-\frac{m^2(1-\cos^2\omega)}{1+2m\cos\omega+m^2}$$
$$=\frac{1+2m\cos\omega+m^2-m^2+m^2\cos^2\omega}{1+2m\cos\omega+m^2}$$
$$=\frac{1+2m\cos\omega+m^2\cos^2\omega}{1+2m\cos\omega+m^2}$$
$$\therefore\ \cos\alpha=\frac{1+m\cos\omega}{\pm\sqrt{1+2m\cos\omega+m^2}}.$$

3. STUDENT.—In all probability a 'Key' to Capel's 'Catch Questions in Arithmetic and Mensuration' will be issued shortly.

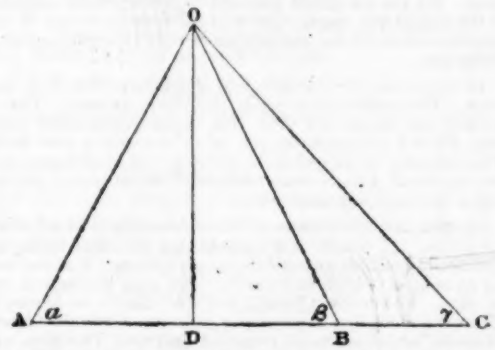
4. CYCLOPS.—Show that in any triangle the length of the perpendicular from A on the opposite side is equal to
$$\frac{b^2\sin C+c^2\sin B}{b+c}.$$
(*Todhunter's* 'Trigonometry for Beginners.')

$$\frac{AD}{AB}=\sin B$$
$$AD=AB\sin B$$
$$=c\sin B,$$
$$\therefore cAD=c^2\sin B;$$
$$\frac{AD}{AC}=\sin C,$$



$$AD=AC\sin C$$
$$=b\sin C,$$
$$\therefore bAD=b^2\sin C;$$
Adding $(b+c)\,AD=b^2\sin C+c^2\sin B,$
$$\therefore\ AD=\frac{b^2\sin C+c^2\sin B}{b+c}$$

5. MISERRIMUS.—The angular elevations of the top of a tower are observed to be α, β, γ, at the stations A, B, C, respectively: the stations are in a horizontal straight line, the direction of which does not pass through the tower; the distance from A to B is p, and the distance from B to C is q, and B is between A and C: show that $p\cot^2\gamma+q\cot^2\alpha$ is greater than $(p+q)\cot^2\beta$. (*Todhunter's* 'Trigonometry for Beginners.')



Let O represent the top of the tower, and let x stand for the distance from D to B.

$$\cot^2\alpha=\frac{AD^2}{OD^2}=\frac{(p-x)^2}{OD^2},$$
$$\cot^2\beta=\frac{BD^2}{OD^2}=\frac{x^2}{OD^2},$$
$$\cot^2\gamma=\frac{CD^2}{OD^2}=\frac{(q+x)^2}{OD^2};$$
$$p\cot^2\gamma+q\cot^2\alpha=\frac{p(q+x)^2}{OD^2}+\frac{q(p-x)^2}{OD^2}$$
$$=\frac{1}{OD^2}\{p(q^2+2qx+x^2)+q(p^2-2px+x^2)\}$$
$$=\frac{1}{OD^2}(pq^2+2pqx+px^2+p^2q-2pqx+qx^2)$$
$$=\frac{1}{OD^2}\{x^2(p+q)+pq(p+q)\}$$
$$=\frac{(x^2+pq)(p+q)}{OD^2};$$
$$(p+q)\cot^2\beta=\frac{x^2(p+q)}{OD^2};$$
$$\therefore\ p\cot^2\gamma+q\cot^2\alpha>(p+q)\cot^2\beta.$$

6. HORACE.—We could not obtain a quadratic equation from your query, as the cubic equation does not give integral roots.

7. D. V.—The question of which edition you should read is a very important one to you. In regard to that, write to the registrar. He would not feel called upon to answer your other query. For the geometry read Euclid V. and VI., and select the other portions from *Wilson's* 'Solid Geometry,' or *C. Smith's* (Macmillan and Co.). *C. Smith's* 'Analytical Geometry' is also a most excellent book.

8. ANXIOUS ONE.—The subjects for 1866 are Shakespeare's 'King Lear' and Bacon's Essays. Use a good edition of 'King Lear,' and study it in connection with *Dr. Abbott's* 'Shakespearian Grammar.' There are several excellent editions of Bacon's Essays. If you are reading alone, you had better have two or three editions, and compare them. Among others try *Dr. Abbott's*, and Rivington's new volume by Storr and Gibson. 'English Lessons for English People,' by *Seeley and Abbott*, would be of service to you in the matter of composition. The paper on School Management now covers a large field. You should read several chapters of *Sully's* 'Psychology,' *Fitch's* 'Lectures on Education,' and *Jevon's* 'Primer on Logic.' At present there is no handy manual on the educative work of Fröbel. You can get an idea of it by reading 'The Kinder-Garten at Home,' by Mrs. Sherriff.

9. KANGAROO.—The scholarship examination is the some all over the country. You had better read the questions set last July, and then judge for yourself. You are clearly expected to be able to translate a short passage. Dr. Smith advises you to work at Part II. in connection with Part I. Do so; you will thus make better progress.

10. G. H. M.—We strongly recommend you not to try and read Cæsar, Book I., in connection with the 'Principia,' Part I. It would be foolish to attempt to do what is impossible. Read the answer you refer to. Obtain Part II., or some similar book, and begin it at once. *Dr. Abbott's* 'Via Latina' and half the 'Principia,' Part II., would be an excellent preparation for the scholarship examination. You must try to sing a few notes; you can use the staff notation. As to Notes of Lessons, those that have appeared in the PRACTICAL TEACHER are quite sufficient, and at the same time the best yet published.

11. WHITWICK.—There is no such reprint as you seem to need. But you can get all you want by writing to the secretary of the college you mean to enter. Ask him for a copy of the questions set at the last examination or two. He will be glad to oblige you.

12. GRIFFITH W. JONES.—You should say what it is you want. The small-hand is legible, and shows promise. That is the best one can say of it (65). The large-hand has many faults (60). There is no reason why you should not write a good hand. The condition of success is to get a set of good copies, and imitate them. Letters must conform to certain types; you are not at liberty to make new ones.

13. WALTER HUTCHENS.—We recommend you to get *Hall's* 'Algebra.' *C. Smith's* is not yet out, but his other works are sufficiently excellent to justify high expectations. You can wait for an opinion of it till next month. The book you have is out of date. Retain the 'Euclid,' and add *Casey's* or *Mackay's*. There is nothing new in geography just now. *Dunstan's* 'Music Manuals,' advertised in last month's PRACTICAL TEACHER, will suit you, or *John Taylor's* 'Musical Theory Course' (Philip and Sons). Get *Canon Daniel's* 'English Grammar' (National Society.) None of these books are dear: 2s. 6d. to 4s. 6d. Writing, small-hand (too stiff), 75: large, 65.

14. JOHN WILKINSON.—'Elementary Practical Chemistry and Laboratory Practice' is published by Messrs. Boulton and Co., Worship Street, E.C.

15. INDOLENT ASSISTANT.—You will gain very many valuable pieces of advice in the query column of the last year on the subject named. We cannot find space to repeat it. It is probable you will do well to take two years for preparation and, in the meantime, get such help as you are able. You are obliged now to take the second year's papers, if you wish to get a certificate of value and the papers are harder than you think. You had better not attempt the French. Get the *new* syllabus, make a selection of the subjects you mean to be examined in, and then you can write again.

16. PYWELL (75).—You cannot do better than study the last few notes of lessons published in this magazine. You will see there how the points to be taught and the methods to be employed are best set out, and how the great object of all such teaching, the cultivation of a child's power of observation, statement, and reasoning, can be attained. Your subject is difficult, you refer to gravitation, but you give no accurate information respecting it. The most important points in composition are arrangement, correctness, and diction.

17. ANXIOUS.—As soon as you like. Apply to the secretary.

18. C.A.S.—Canon *Daniel's* 'Work on the Book of Common Prayer' is quite suitable.

19. A PUPIL TEACHER.—Refer to the code again. Under the head of grammar and composition, you are required to paraphrase a short passage of poetry; you quoted the school management of the third year, not of the second.

20. CYMRO.—Get Part II. and read about half of it. If you can go through *Dr. Abbott's* 'Via Latina,' and have the exercises properly corrected, you would then be thoroughly well prepared for the Scholarship Examination. Your writing is excellent; 90 for both.

21. PYGMALION.—*Gladman's* 'School Management,' or *Collins'*: either will suit your purpose very well indeed.

22. NETTIE.—'Action Songs for Infant Schools' is the title of a book arranged by *Wilhelmina L. Rooper*, and published by Griffiths, Farran and Co.

23. F. AVERY.—If you do not wish to enter college you should apply to the Department for permission. It is strange if they gave no information. Write to the secretary of the School Board for Birmingham, and tell him what you want.

Explain the origin or meaning of the letters or syllables italicised in each of the following words:—

did—The second *d* represents the *d* of the root, and the first the *d* of the reduplication. The perfect tense was once so formed; compare λελυκα and pependi.

sai*th*—The *th* is the suffix of the third person singular, and is the root of *the* and *that*=he.

childr*en*—The oldest plural was childru, which became childre, and then childer; *r* represents that plural.

eith*er*—The *er* is the sign of an old comparative form.

whi*ch*—comes from hwile, the *ch* is the remnant of lic=like.

barl*ey*—is from bere, barley, and leác, a plant,

*a*way—A.S., on weg, the *a* was once *on*.

*S*ample—The *S* here arose from *ex*; (exemplum) ex emere.

ever*y*—every=ever each; the *y* is from the A.S. ælc=each.

24. HANNIBAL.—*Le Français*, the organ of the Professors of French in England, is published by Hachette and Co., 18, King William-street, Strand, W.C., 3s. 6d. per annum. A translation of the Odes, etc., by Londsale and Lee, is published by Macmillan, 3s. 6d.

25. GEORGE BEARD.—'Point out the difference between the diatonic scale and the scale of equal temperament; why is the latter employed for the piano and organ? Science examination, May, 1885.'

A diatonic scale is a series of eight notes, having their vibration frequencies in the ratio of 1, $\frac{8}{9}$, $\frac{4}{5}$, $\frac{3}{4}$, $\frac{2}{3}$, $\frac{3}{5}$, $\frac{15}{8}$, 2. The scale of equal temperament differs slightly from this. The interval from any note to its octave is divided into five tones and two semitones, each tone being $\frac{1}{6}$ and each semitone $\frac{1}{12}$ of an octave. The third of this scale is sharper and the fifth flatter, the sixth and seventh sharper than in the natural diatonic scale. The scale of equal temperament is used for pianos and organs, because it does not favour one key more than another. The interval from A flat to E flat would be intolerable unless all the fifths on the piano were tuned a trifle flat.

26. E. A. R.—'Botany' by *Dr. Hooker*, 1s., and 'First Lessons in Practical Botany' by *G. T. Bettany*, 1s. Macmillan and Co.

27. TREBOR.—For the Scholarship Examination you can use 'The Student's Hume,' *Mackay's* 'Geography,' *Dr. Smith's* 'English Grammar,' or *Canon Daniel's*; *S. Brooke's* 'Primer of English Literature,' *Dunstan's* 'Manual of Music.' The writing is very fair—70.

28. BENJAMIN.—You must take groups (*c*) and (*d*), as you say, unless you passed in them before. And observe that the mathematics is that of the second year, not that of the first. You can only take four groups in all. You cannot take languages therefore, nor science. Composition, and especially writing, poor.

29. ANXIOUS ASSISTANT.—Thank you for your kind expressions, and also for introducing the magazine to your friends. Small hand is good—80. The large hand could soon be made very good. Get some excellent copies and practise for a few weeks. Don't think of failing. Do all your papers moderately well at least, and you will secure a creditable place.

30. X. Y. Z.—See Query 27 in the December magazine.

Hollo—noun, common, singular, neuter, objective case, gov. by *to*.

still—adjective, qualifying 'red.'

red—adjective, used as a noun, obj. case, gov. by 'with, understood.

yet—adv. conj., connecting 'the sails made' to 'it ceased.'
on—adv., qualifying 'made.'
like—adjective, qual. 'noise,' governing *that* (understood) in the dative case.
that—relative pronoun, referring to antecedent 'brook,' 3rd person, sing. number, nom. case to 'singeth.'
one—indef. pronoun, dative case, gov. by the adj. 'like.'
afloat—adjective, qual. 'body.'
swift—adv., qual. 'found.'
as—conj., joining 'dreams' (pass swift) to 'I found myself.'
myself—reflective pronoun, 1st person, sing. number, obj. case, gov. by 'found.'

Sentence.	Kind of Sentence.	Subj.	Predicate.	Completion of Predicate.	Extension.
(*a*)					
I have not to declare	Priff. sent.	I	have	to declare	not
(*b*)					
How long in that same fit I lay	Noun sent. to (*a*).	I	lay		in that same fit How long
(*c*)					
I heard	Prin. sent.	I	heard		
(*d*)					
And in my soul discerned two voices in the air	Prin. sent. co-ord. with (*c*)	(and) I	discerned	two voices in the air	in my soul

31. SELRAHE YALS.—The last time Easter Sunday was on the 25th of April was in the year 1736; the occasion before that was in 1641.

—o—

Recent Inspection Questions.

Arithmetic.

STANDARD I.

(*Sums dictated.*)

(1) 97
563
59
108
827. Ans.

(2) 903
76
827. Ans.

(3) 890
63
827. Ans.

(*Mental Arithmetic.*)

If I have 11 farthings, how many more should I need to make 3d.? How many pence in 7 farthings? How many pence in 21 pence and 19 pence? 7 times 5? 12 times 5? 16 apples and 15 apples: how many altogether? What tables will make 36? 24? 48?

WRITING.

Words dictated: Paper, white, desk, coat, gas.
Transcription: 'I will just mark it out with bricks,' he said.

STANDARD II.

(*Sums dictated.*)

(1) 73,180
9,685
63,495. Ans.

(2) 71,895 × 609
= 43,784,055. Ans.

(3) 30,876 ÷ 9 = 3,430⅔. Ans.

STANDARD III.

(1) Divide eight hundred and seventy-six thousand and fifty by four hundred and thirty-nine.

876,050 ÷ 439 = 1995 $\frac{245}{439}$. Ans.

(2) Add £81,940 10s. 4½d.; £807 10s. 8¾d.; £89 17s. 11¾d.; £18,016 19s. 9¾d.; four thousand and nine pounds fifteen shillings and sevenpence halfpenny, and six thousand and five pounds and threepence halfpenny?

£110,869 14s. 9¾d. Ans.

(3) Find the difference between seven thousand and six pounds six shillings and elevenpence threefarthings and twenty thousand and twenty pounds and threepence halfpenny.

£20,020 0s. 3½d. − £7,006 6s. 11¾d.
= £13,013 13s. 3¾d. Ans.

(4) If a boy saved £4 0s. 7½d. out of his wages, and he spent 1s. 3d. for a necktie, £3 1s. 4d. for a suit of clothes, 3s. 6d. for a hat, 10s. 4d. for a pair of boots, what remains unspent?

£4 0s. 7½d. − (1s. 3d. + £3 1s. 4d. + 3s. 6d. + 10s. 4d.)
= £4 0s. 7½d. − £3 16s. 5d.
= 4s. 2½d. Ans.

STANDARD IV.

(1) Divide twenty-six thousand five hundred and seventy-seven pounds one shilling and three halfpence by three hundred and six.

£26,577 1s. 1½d. ÷ 306
= £86 17s. 0¾d. Ans.

(2) Multiply £10 0s. 1½d. by 880.

£8805 10s. Ans.

(3) Reduce 3 acres 11 perches 12 sq. yds. to square feet.

133,782¾ sq. ft. Ans.

(4) The four sides of a field are 96, 105, 120, 119 yards respectively; how many miles does a boy go who walks round it four times?

(96 + 105 + 120 + 119) × 4
= 1760 yds. = 1 mile. Ans.

STANDARD V.

(1) Find the cost of 231 articles at £2 7s. 5¼d. each.

	£	s.	d.	
5s. = ¼ of £1	231	0	0	= Cost at £1 each.
	2			
2s. = 1/10 of £1	462	0	0	= Cost at £2 ,,
5d. = 1/12 of 5s.	57	15	0	= ,, 5s. ,,
	23	2	0	= ,, 2s. ,,
¼d. = 1/20 of 5d.	4	16	3	= ,, 5d. ,,
	0	4	9¾	= ,, ¼d. ,,
	£547	18	0¾	= £2 7s. 5¼d. ,,

(2) Make out the following bill:—

	s.	d.
7½ lbs. at 7½d. per lb. ..	4	8¼
9 lbs. ,, 3½d. ,, ..	2	7½
19 lbs. ,, 2½d. ,, ..	3	11½
14 lbs. ,, 6s. per cwt. ..	0	9
	12	0¼. Ans.

(3) If I lend a person £112 for 4½ months, how long must he lend me £42 so as to pay me back?

£42 : £112 :: 4½ mos. : 12 mos. Ans.

(4) Find the value of 6 acres 3 roods 14 poles at £12 13s. 1d. per acre.

	£	s.	d.	
2 r. = ½ a.	12	13	1	= Value of 1 acre.
			6	
	75	18	6	= „ 6 acres.
1 r. = ¼ of 2 r.	6	6	6½	= „ 2 rds.
10 p. = ¼ of 1 r.	3	3	3¼	= „ 1 rd.
2 p. = ⅕ of 10 p.	0	15	9½	= „ 10 poles.
2 p. = ⅕ of 10 p.	0	3	1½+	= „ 2 „
	0	3	1½+	= „ 2 „
	£86	10	5	= 6 a. 3r. 14 p. Ans.

STANDARD VI.

(1) From 1 take its ¼, ⅛, and ⅛, and divide the remainder by $\frac{1}{12}$ of $4\frac{3}{5}$.

$$1-(\tfrac{1}{4}+\tfrac{1}{8}+\tfrac{1}{8})\div\tfrac{1}{12}\text{ of }4\tfrac{3}{5}$$
$$=\tfrac{4}{4}-\frac{10+8+5}{40}\div\tfrac{1}{12}\times\tfrac{23}{5}$$
$$=\tfrac{17}{40}\times\tfrac{60}{23}$$
$$=\tfrac{51}{46}$$
$$=1\tfrac{5}{46}.\text{ Ans.}$$

(2) Bring $\frac{3}{11}$ of £2 10s. 5d. to the decimal of £34 7s. 6d.

$$\frac{\tfrac{3}{11}\text{ of £2 10s. 5d.}}{\text{£34 7s. 6d.}}$$
$$=\tfrac{3}{11}\times\frac{£2\,10s.\,5d.}{£1}\times\frac{1}{£34\,7s.\,6d.}$$
$$=\tfrac{1}{50}$$
$$=\cdot02.\text{ Ans.}$$

(3) In what time will £81 be gained by £450 at 4½ per cent. per annum?

	yr.	yrs.
£4½	: 81 ::	1 : 4 Ans.
£450	: 100	

Or, In one year £450 makes $4\frac{1}{2}\times4\frac{1}{2}=20\frac{1}{4}$.

$$\text{Time to make 81}=\frac{81}{20\frac{1}{4}}=4\text{ yrs. Ans.}$$

(4) If ·6̇ of a cistern be emptied by a tap in $4\frac{3}{4}$ hrs., in what time will $\frac{19}{21}$ be emptied?

$$\cdot\dot{6}=\tfrac{6}{9}=\tfrac{2}{3}\text{ hrs.}$$

hrs.	hrs.	
$\frac{2}{3}$: $\frac{19}{21}$ ::	$4\frac{3}{4}$:	$3\frac{11}{14}$d. Ans.

STANDARD VII.

(1) If the carriage of 3 tons 8 cwt. for 20 miles be £2 10s., what will it cost for 6 tons 5 cwt. for 6 miles?

cwts. 68	: 125 ::	£2 10s.	:	£1 7s. 6$\frac{5}{7}$d. Ans.
miles 20	: 6			

(2) At what rate will £240 amount to £252 10s. in 9 months?

£252 10s. − £240 = £12 10s. total int.

£240	: 100 ::	12½	: 6$\frac{7}{8}$. Ans.
9	: 12		

(3) Find the average of ·01, ·0$\dot{8}$, ·0, $\frac{4}{7}$ and $\frac{5}{6}$. Give the answer in vulgar fractions.

$$(\cdot01+\cdot0\dot{8}+\cdot0+\tfrac{4}{7}+\tfrac{5}{6})\div5$$
$$=(\tfrac{1}{100}+\tfrac{8}{90}+\tfrac{4}{7}+\tfrac{5}{6})\div5$$
$$=\left(\frac{63+560+3600+5250}{6300}\right)\div5$$
$$=\tfrac{9473}{6300}\times\tfrac{1}{5}$$
$$=\tfrac{9473}{31500}.\text{ Ans.}$$

(4) By selling an article for £35 15s., 8 per cent. of the cost was lost. What should I have gained or lost if I had sold it for £37?

Selling price = 100 − 8 = 92.

$$\therefore\ £35\,15s.\ :\ £37\ ::\ 92\ :\ 95\tfrac{21}{143}$$
$$\therefore\text{ Loss per cent.}=£100-95\tfrac{21}{143}=4\tfrac{118}{143}.\text{ Ans.}$$

Algebra.

FIRST STAGE.

(1) If $x=2$, $b=3$, $y=4$, $f=0$, find the value of $3b(x^2-y^2)+5(b+x)^2y-2bf^3xy$.

$$=3.3(2^2-4^2)+5(3+2)^2.4-2.3.0.2.4$$
$$=9(4-16)+5.25.4-0$$
$$=-108+500$$
$$=392.\text{ Ans.}$$

(2) Multiply $2x^2-7x-15$ by x^2-x-6, and divide the result by $x^2-3x-10$.

$$\begin{array}{r} 2x^2-7x-15 \\ x^2-x-6 \\ \hline 2x^4-7x^3-15x^2 \\ -2x^3+7x^2+15x \\ -12x^2+42x+90 \\ \hline 2x^4-9x^3-20x^2+57x+90 \end{array}$$

$$\begin{array}{r|l} 2x^4-6x^3-20x^2 & 2x^2-3x-9 \\ \hline -3x^3+57x & \\ -3x^3+9x^2-30x & \\ -9x^2+27x+90 & \\ -9x^2+27x+90 & \\ \hline \end{array}$$

(3) If $x=5$, $y=4$, $z=-1$, find the value of

$$\frac{x^2+y^2}{x^2-y^2}+z.$$
$$\frac{x^2+y^2}{x^2-y^2}+z$$
$$=\frac{25+16}{25-16}-1$$
$$=\tfrac{41}{9}-1$$
$$=3\tfrac{2}{9}.\text{ Ans.}$$

(4) Divide x^5-y^5 by $x-y$.

$$x^5-y^5\div x-y$$
$$=x^4+x^3y+x^2y^2+xy^3+y^4.\text{ Ans.}$$

(5) Take $2x-3\{y-(x-y)\}$ from $2y-3\{y-(x-y)\}$.

$$\begin{array}{l} 2y-3\{y-(x-y)\} \\ 2x-3\{y-(x-y)\} \\ \hline 2y-2x\qquad\text{Ans.} \end{array}$$

Grammar.

STANDARDS VI. AND VII.

(1) Analyse the following sentence, and parse the words in italics:—

'The *natives*, *while* the ship *which had brought* them *departs* from the land, with admiration, *gazing stand*.'

(2) What are the prefixes used in the following words? Give their meanings:—Subvert, adhere, intervene, perspire, collect, obstruct.

Notes of Lessons on Ocean Currents.

BY JOS. H. COWHAM, F.G.S.,

Lecturer on School Method at the Westminster Training College.

MOVEMENTS OF WATER. Part III.

The Tides—Lesson I.

NOTES OF INFORMATION, ARRANGED UNDER HEADINGS.

A. **Introduction.**—In past lessons it has been shown that:—

1. **Waves** were simply up and down (undulatory) movements of surface water.
2. **Currents** were forward (translatory) movements of both *surface* and *deep* water.
3. The **Tides**, which form the subject of this lesson, are both undulatory and translatory.

   In the Southern Ocean the tide is simply a vast wave. In the narrow seas round Britain, and in our estuaries, it is a current.

B. **Simple and Obvious Tidal Phenomena.**

1. On beaches and in estuaries the water is constantly varying its level.
2. Sometimes the water covers the beach, or fills the estuary. We call this **High Tide.**
3. At other times the beach is bare, and the water in the estuary is low. We call this **Low Tide.**

Note.—The tidal change from low to high tide is sometimes termed **Flood Tide.** That from high to low tide is termed **Ebb Tide.**

C. **Explanation of the Phenomena stated above.**

In order to explain tidal phenomena it is necessary to take the following preliminary steps:—

1. Enumerate, and, as far as possible, illustrate, the **Principles of Gravitation**, thus:—

   (*a*) All bodies tend to draw other bodies towards them. This force, which all bodies possess, is termed Gravitation.

ILLUSTRATIONS AND OTHER TEACHING AIDS.

1. Revise, by questioning, the previous lesson on ocean waves.
2. Question upon the chief facts taught in last month's lesson on '**Ocean Currents.**'
3. State these facts. Then impress by contrasting with forms of water-movement previously taught.

Fig. 1.—A, High-water mark.

Fig. 2.—B, Low-water mark.

Refer to experiences of children when on a visit to the seaside, and assist the memory by simple diagrams, like Figs. 1 and 2.

1. Much of this matter can only be stated and illustrated. The full explanation cannot be grasped by children.

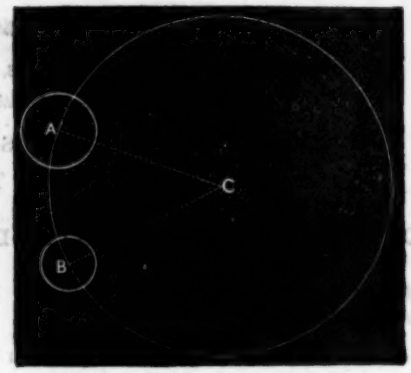
(*a*) Some of the effects of Gravitation may be stated by the teacher, *e.g.*,

1. The apple falling to the earth, which aroused Sir Isaac Newton to inquire why? and which thus led to the discovery of the Laws of Gravitation.
2. Bodies have weight. This is an effect of the force of gravitation.
3. Ask for other effects from the class.

(*b*) The greater the mass of any body, the greater is the force of Gravity which it possesses.

'The force varies directly as the mass.'

This is true of all bodies whether terrestrial or extra-terrestrial, and the statement of the truth is termed **a Law of Gravitation.**

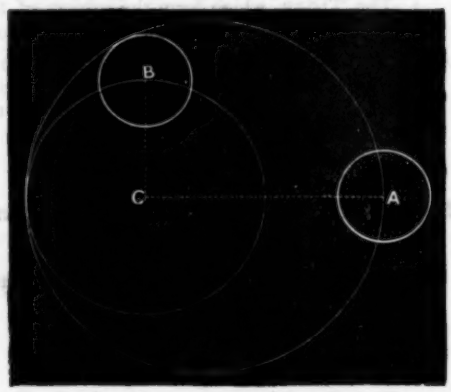


(*b*) Fig. 3.—If two bodies be represented by the circles A and B, one of which A is twice the mass of B. Then the attraction of A upon any body at C would be twice that of B upon the same body. *Note.*—A and B are equally distant from C.

(*c*) This force which one body exerts upon another depends also on the distance at which it acts.

'The force varies inversely as the square of the distance.'

This statement is termed **a Law of Gravitation,** and with the law stated above, should be learned and applied.



(*c*) Fig. 4.—Two bodies, A and B, are of equal mass. A, however, is twice the distance of B from a third body at C. Then A will exert one-fourth the force of gravitation exerted by B.

2 Besides the Principles of Gravitation, the following truths must be accepted :—

(*a*) The bodies which, like our earth, are spheres, have their particles symmetrically arranged around the centre, and the force of Gravitation of the entire sphere is reckoned as concentrated at the centre.

(*b*) The earth is a rigid mass, and can only move as a whole. On the other hand, the water on the earth's surface can move independently of the earth.

(*a*) See the above circles for illustration. The reason is apparent if it is considered that a spherical body is made up of a great number of equal particles. Now as the mass of each particle is the same, their varying distances only need be taken into account. Some are nearer the attracted body than others. *The average distance of all the particles is that measured from the central point.*

(*b*) This need only be stated.

D. Application of the above principles and truths in explanation of Tidal Movement.

For the sake of simplicity it is necessary to suppose two conditions which do not exist in nature, viz. :—(*a*) That the earth is entirely covered with water. (*b*) That only the moon attracts this water to form a tide.

Now by applying the principle marked (*c*) above, we get the following results :—

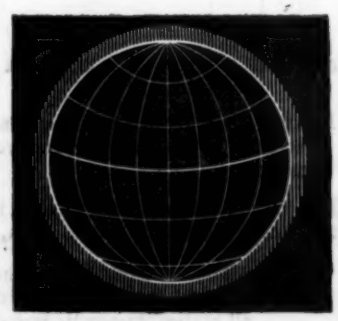


Fig. 5.—Earth with a supposed spherical envelope of water.

1. The moon's attraction upon the earth as a whole at E, and upon the water at A, which is the earth's radius nearer to the moon, would differ so that the attraction would be greatest at A, and the water would be heaped up at A to form a tidal wave.

2. The water on the opposite meridian B would be less powerfully attracted than the earth as a whole at E. Hence a second tidal wave is formed 180° distant from A.

3. By this double result of gravitation the spherical envelope of water is changed in shape to that of an ellipse, so that

   (*a*) All parts along the meridian ANBS have **High Tide.**

   (*b*) All parts 90° E. and W., *i.e.*, along the meridian NES have **Low Tide.**

4. Now introduce the rotatory movement of the earth, and it will be seen that instead of a high and low tide remaining always over the same meridian, every meridian would have high and low tide in succession twice every twenty-four hours.

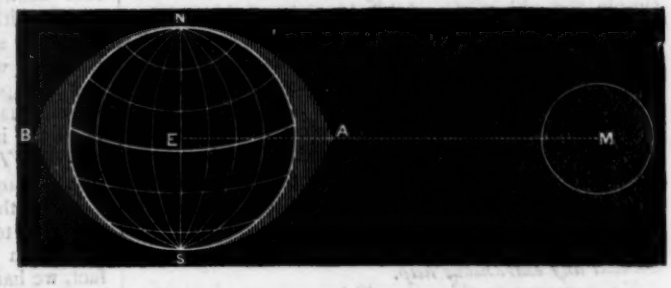


Fig. 6.—The water envelope changed from the spherical to the elliptical in shape by the attraction of the moon.

1. Besides the above illustration, apply the second law of gravitation by means of the following calculation:—

   If distance AM = 236,000 miles,

   And distance EM = 240,000 „

   Then the moon's attraction on the earth at E is to the attraction on the water at A, as

   $$(\tfrac{1}{240000})^2 : (\tfrac{1}{236000})^2$$

2. Explain in similar way to 1.

3. See diagram, Fig. 6.

4. This will best be explained by using a globe. Show that by rotating the globe every meridian passes twice under the brass meridian. In the same way by the rotation of the earth a *double* tide is produced.

The Nääs Slöjd.

BY MISS J. WARREN,

Inspectress of Infant Schools to the Leicester Board.

(*Continued from page* 498.)

IN my two last articles on the above I dwelt somewhat fully on the principles upon which the work is founded. I now proceed to give, with what remarks may be necessary, the eighteen strict rules with regard to the models or patterns from which the children work. *Ten of these rules* have to do with choosing the patterns, and the rest, *eight in number*, to the proper arrangement in the series. Just a word here for those of my readers who may have been misled by the term *model;* a far better word would, I believe, be *pattern;* but since the former is so likely to slip out in the course of my papers I shall keep to it throughout.

Rule I.—All articles of luxury are to be avoided.

This is considered the most important of all the rules. No system admitting of works other than useful can be truly educative, but at the same time we must look upon the term 'luxury' as a relative notion —there is no such thing as absolute luxury. In our Slöjd course we endeavour to dignify labour, and to produce by judicious work a love of and for it; but if we admit amongst our models those devoted to ornament only we encourage a love of show and foster vanity. The child will get to value his work not for the use but the beauty, and when required to make a really useful work lacking the same ornamental design he will find himself discontented, and the good intended will be lost. The Nääs teachers really went to Dame Nature for this wise rule, for in the primitive times we look in vain for the ornament, and it is interesting in connection with this point to watch the steps in culture. We here first have the *necessary*, then the *useful*, and afterwards the *agreeable*. Tabulating these in dwelling, clothes, or food we arrive at something like the following:—The earliest dwellings of which record is left were simple one-roomed huts for protection from the weather and wild beasts. Later on in the march of culture we find them developing into houses divided into living room and outhouses, and garden for food produce. And, finally, from these simple necessary structures we get the Belgravian Mansion of the present day. To sum up in brief, I may say that we must not add one more to the temptations besetting our boys and girls when they go out of school by leading them to suppose that the beautiful ever stands before the true. Some schools on the Continent deal largely in so-called artistic work, but this is wholly contrary to Slöjd teaching.

Rule II.—That the completed works shall find a place in the homes of the children.

I must ask all teachers to carefully note this rule. It opens the question of a different series for town and country, and indeed for different places generally. And it has been found a most difficult rule to adhere to; but, nevertheless, it must be retained at any cost, its value being in exact proportion to its difficulty.

For children to take home their own work cultivates a bond of sympathy between home and school; and who among us will dare to undervalue this element who does not feel that it is one of the most important factors in true education. Again, the child likes to see the model used; the lesson of usefulness so exceedingly practical cannot be lost. It may be a pudding-spoon that the mother uses with a pride mutual, though motherly, or it may be a footstool that

is borne in triumph to the grandmother. However simple the object, the child's hand has fashioned it, and never in manhood will he covet idleness through want of knowledge that labour brings its own delight. Diligence and perseverance are greatly stimulated by this, our second rule. The joy that is God-planted in all children (though warped for want of cultivation later on)—the joy, I repeat, of working for those we love will keep the heart warm, the arm active, and the brain at work long after all persuasion has ceased in effect.

Rule III.—Each model shall be completed by the child without any extraneous help.

To comment on this rule will be unnecessary. My remarks on self-dependence are sufficient. I may just add, that truthfulness is taught by a strict adherence to it, and the temptation to put the proverbial finishing touch is avoided. The pernicious practice so largely resorted to by the draughtsmen with their pupils not only leads to a want of integrity in the children, but causes, alas! much disappointment in their homes, when it is found that the master-touches are in reality unmastered. The idea of giving this rule a place is to render every pupil capable of reproducing the model he has made. We found many times to our cost when studying the Slöjd that this rule was in active operation; and any help unwittingly bestowed by some sympathising fellow-worker resulted in a total destruction of the model in hand.

Rule IV.—That only wood shall be used in the completion of the models.

Some detail explanation is here necessary. It will readily occur to any one that many simple models might be made of wood, but finished with some other material, such as hinge, bolt, screw, button, or the like.

The models of Nääs are so managed as to require nothing further than nails in completion. One reason for this was a laudable economy, to instruct the pupil from simple material; since in his future life he must make the most of that at hand, to teach him that there is no reasonable excuse in the fact that material is limited, to show him that one material can be so fashioned as to fill a great number of uses, that its future value lies in the right manipulation of its various parts, more than in its combination with other materials.

Rule V.—The models shall not be stained nor varnished, but polished only.

In the first place this rule was found necessary, because all carpenters and other craftsmen, pretending to any thought on the subject in connection with children, declared that the staining or varnishing was a work utterly beyond their capacity, and schemes in which it was carefully tried fell through; again, the lessons of cleanliness and neatness we wish to teach by our Formal Education would receive a check, if not a death-blow. Another very important reason for this rule is that a child will, by the use of stain or varnish, come in time to think that order and exactness can be gained by other than legitimate means; in other words, he may learn that flaws in the workmanship appear less serious after the varnishing process, and thus he gradually thinks lightly of a very serious matter.

Rule VI.—As little material as possible shall be used. The models shall be small.

The first cause for this is that the value shall be in the work, rather than in the material; the second, that economy shall be studied so far as it is compatible with efficiency; and another cause yet, is that the child shall not weary for the lack of variety. It would be well if some of our intellectual studies were worked upon this sound principle. Many teachers are hopeless failures, owing to the few minutes, too many of them, in their false anxiety, devote to a subject.

Rule VII.—The children shall have practice in both hard and soft woods.

When this rule was explained to us I was very much surprised to find that not only were both woods to find a place in an elementary series, but that in point of fact, we had given to us a medium wood wherewith to start. The reason of this was that, in using the knife, there is less danger than in either the very soft or very hard varieties, and general dexterity to which I referred in my last paper is obtained only by practice with all sorts of wood.

Rule VIII.—That as little turnery and sculpture as possible should be introduced into the models.

First as to turnery. The motion with the legs is found to be unsatisfactory, and the fact of using the lathe would somewhat spoil the idea of this Slöjd being introduced to counteract sedentary work. If the wheel be turned by machinery the work ceases to be completed by the child.

The carving necessitates close-sitting, and produces a most injurious contraction of the chest. There are some schools in Switzerland (where the Swiss toys are made), that have obtained a reputation at the expense of the children's future health. Some carving is done in a standing posture, but with the body and head brought abnormally forward. In a wood Slöjd these two things cannot be left out, but as little as possible must be done; for example, a work well done may be enhanced by carving, but never should a child be allowed to ornament a work showing weakness in its fundamental operations.

Rule IX.—That the objects through true forms shall operate to the development of the sense of form and beauty.

This is a little difficult to define, but the meaning of the rule really is that the education of the eye shall be carried on by the constant copy of a true form, which form shall be reproduced, not only by the eye, but by the hand. The beauty here lies, as will be seen, in the perfection of production. It has been found almost an impossible thing to develop the power of the eye to any appreciable extent. Drawing has been hitherto largely resorted to, wax and clay also, but the Nääs Slöjd deals with more than mere lines and surfaces, or shapeless materials; the child works, too, not from plan nor picture, but from the actual model. I shall have more to say on this point in another paper.

Rule X.—That after passing through the series of models, pupils shall have used every tool connected with wood Slöjd, and have gained a knowledge of the various manners of using them, in the performance of the different manipulations, and have obtained exercise in the different combinations.

With this rule I will close this month's paper, proceeding in the next with the eight that are given to enable us to build up the series. I hope also to give a list of the models and the tools, so far as I have been able to translate them into our language.

(To be continued.)

Science Notes.

Students in science classes in connection with the Science and Art Department are now within measurable distance of their examination. The report of the examiners for May, 1885, has been issued for some time. Teachers will do well to read it carefully, or at least such portions of it as relate to their own work. It is a pity candidates do not observe the rules laid down as to the questions they may attempt. In 'Building Construction' we find that eleven papers were cancelled for trying advanced as well as elementary questions; and sixteen candidates lost marks for not trying three out of the first four questions as they were asked to do. In regard to the practical Chemistry of the elementary stage it is stated that the methods employed were often specially planned to meet the requirements of the examination, which in this stage were very limited. The object of giving only a limited number of substances, is that methods of separation may be employed, and above all that a proper series of characteristic and confirmatory tests may be used. The examiners also recommend that the bases of the heavy metals, should be removed before proceeding to test for the acids. In the advanced course of the practical work the candidates are advised to be more systematic, to make simple and clear record of results, and to take care that the substances found are completely identified. The examiner in Geology draws attention to the marked improvement in illustrating by diagrams; sketches are still, however, less precise and illustrative than he desired. In learning Physiology, we are told, what is wanted is not increase of energy in teaching, or of diligence in the taught, but a better direction of the energy. It is believed that, in many cases, elementary and advanced candidates are taught the same plan to the detriment of both. Elementary candidates insufficient practical teaching, the advanced candidates in the majority of cases appear to get none at all, or only a repetition of that provided for the elementary class. The advanced Physiography papers were better than usual; but those on the principles of agriculture, elementary stage, fell off in quality as well as in number. There was a large number of distinctly stupid papers.

The papers in the advanced stage showed that there is a steady and progressive improvement in the character of the work done by the teachers. A large number of the best-taught students only answered five instead of six questions, which explains why many only secured a second-class who promised fair for obtaining the first rank. Teachers will do well to impress upon their pupils the necessity of observing the directions even to the letter. It is hard that a conscientious teacher should lose his reward because a candidate does not comply with the conditions of the examination. Often it may be a matter of forgetfulness; but perhaps more frequently a want of the habit of complying with regulations, which is of itself a valuable acquisition.

***

The Association for the Improvement of Geometrical Teaching held its annual general meeting on Friday, January 15th. In the afternoon the President (R. B. Hayward, F.R.S.), gave an address on the correlation of the different branches of elementary mathematics. In the discussion which followed, a few points were considered which relate to subjects of general importance. In dealing with the minus sign attention was called to the difference between a continuous quantity like length and a number. The president pointed out that in counting, we ought to start from zero and not from one. Professor Carey Foster suggested that a boy should move a pencil along a ruler, and say one, two, three, as the point passed the successive inches. This would give the idea of the flow of quantity and of units of length, the right to be called positive, then those to the left could be called negative. A piece of paper with inches marked on it would be perhaps more useful than a ruler, as it would be possible to put upon it the zero, and also continue the figures to the left of it with the — prefixed. Reading a thermometer was also referred to. A teacher, however, will readily see how the slip of paper or a scale on a black-board can be made useful, not only in introducing the idea of a minus quantity, but in verifying such statements as

$$+4-4=0, \text{ or } +5-3=+2, \text{ or } 3-5=-2.$$

It was pointed out that the rule of signs in multiplication follows easily if we say that we must do to the multiplicand what we have to do to unity to make it into the multiplier; thus $-2\times-3=6$. To pass from unity to -3 we multiply by the number and change the sign, hence in multiplying -2 by -3 we multiply the numbers and then change the sign of the quantity to be multiplied; we thus get both the *magnitude* of the quantity, and the *sense* in which it is to be taken.

Great stress was laid on giving such definitions as would not have to be unlearned afterwards; they should be true as far as they go, and though their meaning may have to be extended, it should never have to be contradicted; and of two otherwise equally good definitions, that is the best which anticipates what is to follow and which will be useful in higher parts of the subject.

The difficulty and value of translating ordinary into algebraic language were dwelt upon. Such work is an excellent training and a searching test. School algebras contain too few of such examples, though teachers will remember that there are good specimens of them in Hamblin Smith's Algebra, and also in that of S. Newcomb.

The subject of Mechanics was admitted to be exceedingly difficult for beginners, though the present improved nomenclature was felt to be a considerable relief. Boys will no longer be tormented in fruitless endeavour to distinguish between moving, accelerating, and centrifugal forces. Now something like precision has been attained, teachers cannot long too much for uniformity. It should not be open for any one who likes to alter the definitions in mechanics any more than those in geometry. The speakers could not decide whether statics or dynamics should come first. Mr. Ellis considered the proofs of the parallelogram of forces generally given as not worth the paper on which they were written. The few pages that would make this subject clear to a beginner had yet to be written. There seemed to be a general agreement that the subject should be treated arithmetically at first, that the inherent difficulty of the subject was enough, without increasing it by the use of algebraic language and symbols.

***

Messrs. Wodderspoon and Co., Serle Street, Lincoln's Inn, are publishing, says *Nature*, in one sheet

on paper, for sixpence, an easy guide to the principal constellations and stars visible in Great Britain. We have first a map of circumpolar stars, and another showing those north and south of the equator, the guiding lines by which the stars can be easily found from the instructions being printed in red ink. It is very clear that the author has embodied in this cheap chart the results of much labour for the teaching of people uninstructed in such matters.

***

ON Monday, the 4th of January, a shock of earthquake was experienced all along the route between Dartmouth and Kingsbridge, Devonshire. It seems to have been most severely felt at Torcross.

***

JUST now everybody agrees that draughts are a nuisance. The better the fire we make, the more evident they become. And if we do at last succeed in keeping them out, as indeed we rarely can, then our fire burns dull and begins to smoke. How can we retain the delight of an open grate, and yet have plenty of fresh air to breathe, and at the same time be warm? There is a fortune for anybody who has a practical answer. Let us haste to say we do not profess to have one. But between leaving things as they are and having them as we could wish there is a wide interval. Let those who can try the experiment without much difficulty first lay a pipe under the floor, one end of it opening near the firegrate and the other end out of doors; a good deal of the air needed for the combustion in the grate will come through this pipe; secondly, insert a mica-plate ventilator in the chimney—much of the hot bad air will escape by it. The air in the room will be purer and warmer, and the draught will be much reduced.

Publications Received.

Bell (G.) and Sons—
Latin Vocabularies for Repetition. By A. M. M. Stedman, M.A.
Handbook of Musical Biography. By G. A. Caspar and E. M. Patmore.
Books for Young Readers. The Whole Boat-House, etc. Great Scotsmen.

Blackie and Son—
Vere Foster's Copy Books. No. 3.

Cassell and Co., Limited—
Cassell's New Standard Drawing Books. A to G. Standards I. to IV.

Chambers (W. and R.)—
Magnetism and Electricity. By H. C. Tarn, M.C.P., F.S.Sc.

Dawson (A. G.)—
The Townley Alphabet Sheets. Small Letters.

Gilbert and Rivington—
The 'Triple' Examination Test Cards. Standards II. to VII.

Heywood (John)—
The Manchester Quarterly. January.

Laurie (T.)—
Diagrams and Instructions for Freehand Exercises in Geometrical Forms. By the Rev. C. R. Richson, M.A.
Elementary Freehand Drawing Copies. Nos. 1 and 10.
Suggestions for Establishing Popular and Educational Museums of Scientific and Art Collections. By T. Laurie.

Longmans and Co.
The Early Hanoverians. By Edward E. Morris.
Longmans Magazine. February.

Marcus Ward and Co.—
Date Calendars, 1886.

Nelson (T.) and Sons—
The Little Primer.
The Little Readers. Parts 1 and 2.

Philip (G.) and Son—
Healthful Exercises for Girls. By A. Alexander.

Relfe Bros.—
Notabilia of Greek Syntax. By the Rev. F. Wilkins Aveling, M.A., B.Sc.

Robertson (G.) and Co., Limited—
A Geography for Primary Schools. By R. Gumley.

Sampson Low and Co.—
School Electricity. By J. E. H. Gordon.

Stewart (W.) and Co.—
Stewart's Civil Service Text Books:—
Digest of Returns and Tabular Statements. By William Russell.
Indexing and Précis-Writing. By Wm. Russell.
The Civil Service Calendar, 1886.

Thacker, Spink, and Co.—
Hints on the Study of English. By F. J. Rowe, M.A., and W. T. Webb, M.A.

Thorn (A.) and Co.—
Book-keeping. Parts 1 and 2. By J. J. Doherty, LL.D., T.C.D.

Westminster School Depot—
Walker's Annotated Recitation Cards. Standards I. to VII.

Pupil Teachers' Examination Papers.
WITH ANSWERS.

[*Note.*—The following questions for first, second, and third year pupil teachers have been prepared as a suitable test for those to be examined in April next. It is strongly recommended that each pupil teacher should answer those for his own year in the allotted time, and either have them examined by his teacher, or compare them with the answers which are printed herewith. Fourth year pupil teachers should be well advanced with their work, and the Scholarship Questions, with Answers which have placed the writer at the top of the list, will be studied by them with interest and profit.]

Arithmetic.

MALES.

1. Simplify $\frac{4\frac{1}{7}\frac{8}{9} \div 21\frac{1}{3}}{14\frac{1}{2} \div 5\frac{1}{11}} + 672\frac{1}{11}\frac{1}{11}$.

2. Divide ·030576 by ·091, and find the value of ·325 of a mile.

3. Find the Least Common Multiple of 9, 16, 27, and 12, and the G.C.M. of 9984 and 16,848.

4. If 48 men can build 52 houses in 107 days, how long would 15 men be in building 195 houses?

FEMALES.

1. Find by practice the rent of 13,824 acres of land at £1 13s. 5d. per acre.

2. Find the value of 17 lbs. 10 oz. of gold at £4 4s. 6d. per oz.

3. Make a bill for 6 lbs. of cheese at 8½d. per lb., 16¼ lbs. of sugar at 2¾d. per lb., 6¾ lbs. of butter at 1s. 1½d. per lb., 27 lbs. of macaroni at 5½d. per lb.

4. Find the G.C.M. of 144 and 528, and the L.C.M. of 5, 4, 15, 8, and 13.

Grammar.

MALES AND FEMALES.

O *father!* I hear the church-bells *ring;*
Oh, say, *what may it be?*
'Tis a *fog-bell* on the rock-bound coast!
And he steered for the open *sea.*

1. Analyse the above passage.
2. Parse the words in italics.
3. Give a list of the common terminations of English nouns and adjectives.
4. What are the different kinds of pronouns? Give examples of each.

Geography.

Answer two questions one of which must be Question I.

1. Draw a map of one of the following:—
(*a*) Australia.
(*b*) The east coast of Scotland.
(*c*) Wales.

2. Name the mountains and rivers of Scotland with the seas into which the rivers flow, and the chief towns on their banks.

3. What are the divisions of Ireland and the industrial pursuits of the people?

History.

1. Who were Julius Cæsar, Julius Agricola, Caractacus, Boadicea, Adrian, Gregory, Augustine, and Dunstan?

2. Give a short account of any two of the Saxon kings.

3. What was the condition of England at the close of the Roman occupation?

Composition.

Write from memory the substance of the following story after reading it through once :—

It is related of an English yeoman called John Person, that during one of the battles between the English and French in the reign of Henry VII., he showed great bravery and insensibility to pain. After a cannon shot had carried away his foot, he continued to shoot his arrows till the French fled. He then turned to one of the archers and said, 'Have thou these six arrows that I have left, and follow thou the enemy, for I may not.' A few days after, this brave man died.

Needlework.

FEMALES.

One hour to be allowed for this exercise.

1. Put a patch two inches square on a piece of calico, and on the same piece of calico give specimens of the different kinds of stitches used in Standard IV.

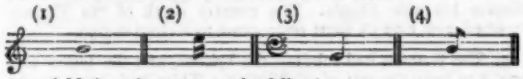
[Music.

A quarter of an hour allowed for this paper.

Answer the questions in Old Notation or in Tonic Sol-Fa, but not both.

1. Write above each of the following its value-name (crotchet, &c.), and below its pitch-name (C, or Do, &c.):—

(1) (2) (3) (4)

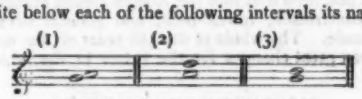


2. Add time-signatures to the following :—

(1) (2) (3)

3. Write below each of the following intervals its name :—

(1) (2) (3)



TONIC SOL-FA NOTATION.

1. Write out three bars in four-pulse measure, and three of three-pulse measure.

2. What are the following intervals :—(1) *soh* to *lah*; (2) *lah* to *ray*'; (3) *soh* to *te*?

3. What is meant by "Key A" at the beginning of a piece of music? How would you find it?

ANSWERS.

Arithmetic.

MALES.

1. $\dfrac{4\frac{n}{11} \div 21\frac{1}{2}}{14\frac{1}{2} \div 5\frac{n}{11}} + 672\frac{211}{161}$

$= \dfrac{\frac{48}{11} \times \frac{2}{129}}{\frac{29}{2} \times \frac{1}{11}} + 672\frac{211}{161}$

$= (\frac{8}{43} \times \frac{4}{11}) + 672\frac{211}{161}$

$= \frac{32}{473} + 672\frac{211}{161}$

$= 672\frac{243}{161}$. Ans.

2. ·091)·030576(·336. Ans.

273

327

273

546

546

·325 m.

8

2·600 fur.

40

24·000 poles.

2 fur. 24 p. Ans.

3. 3 | 9. 16. 27. 12.
16. 9. 4

L. C. M. = 3 × 16 × 9 = 432. Ans.

9984)16848(1
9984
6864)9984(1
6864
3120)6864(2
6240
624)3120(5
3120

G. C. M. = 624. Ans.

4. days days
Men 15 : 48 :: 107 : 1284. Ans.
houses 52 : 195

FEMALES.

1.

	£	s.				
10s. = ½ of £1	13824	0	= rent of 13824 at £1		per acre.	
3s. 4d. = ⅓ of 10s.	6912	0	= ,,	,,	10s.	,,
1d. = 1/20 of 3s. 4d.	2304	0	= ,,	,,	3s. 4d.	,,
	57	12	= ,,	,,	1d.	,,
	£23097	12	= ,,	,,	£1 13s. 5d.	,,

2. 17 lbs. 10 oz. = 214 oz.

	£	s.				
4s. = ⅛ of £1	214	0	= Value of 214 ozs. at £1 per. oz.			
	4					
	856	0	= ,,	,,	£4	,,
6d. = ⅛ of 4s.	42	16	= ,,	,,	4s.	,,
	5	7	= ,,	,,	6d.	,,
	£904	3	= ,,	,,	£4 4s. 6d.	per oz.

3.

114, High Holborn,
London, Oct. 20th, 1885.

Mrs. JOBSON,

Bought of T. ROBINSON.

	£	s.	d.
6 lbs. cheese at 8½d. per lb.	0	4	4
16½ lbs. sugar at 2½d. ,, ...	0	3	5½
6¾ lbs. butter at 1s. 1½d. per lb.	0	7	6
27 lbs. macaroni at 5½d. ,, ...	0	12	4½
	£1	7	7¾

Paid, same time,

T. ROBINSON.

4. 144)528(3
432
96)144(1
96
48)96(2
96

G. C. M. = 48. Ans.

5, 4, 15, 8, 13

L. C. M. = 15 × 8 × 13 = 1520. Ans.

Grammar.

MALES AND FEMALES.

1.

Subject.	Predicate.	Object.	Extension.
O father (nom. of address)			
(*a*) I	hear	the church bells (to) ring	
(*b*) [Oh] [thou]	say		
(*c*) it	may be what		
(*d*) it	is a fog-bell on a rock-bound coast		
(*e*) [and] he	steered		for the open sea (place)

2. *Father*—com. noun, masc., sing., nom. of address.
ring—irreg. intrans., act., in fe. prs., gov. by *hear*.
what—interrog. pro., neut., sing., 3rd per., nom. after *may be*.
may—aux. verb to *be*, indicating pot. mood, pres. tense.
it—pers. pro., neut., sing., 2nd nom. to *may be*.
be—irreg. intrans. verb, act., inf. pres., gov. by *may*.
may be—irreg. intrans. verb, act., pot. pres., 3rd per., sing., agr. with *it*.
fog-bell—comp. com. noun, neut., sing., nom. after *it*.
sea—com. noun, neut., sing., obj., gov. by *for*.

3. The common terminations of English nouns are *er, ar, ard, art, est, ster*, signifying agent or doer; *ling, let, lock, kin, ock*, forming diminutives; and the following signifying abstract ideas, such as condition, state, action, etc.—*age, dom, ery, hood, head, lock, ness, ship; el, et, le* denote instrument.

English adjectives are formed by means of the following affixes:—*al, en, ern, erly, fold, ful, ish, less, like, ly, some, ward, y*.

4. Pronouns are *Personal, Relative*, and *Interrogative*.

Personal pronouns are substitutes for nouns, as *I, thou, he, she, it, we, you, they, one*.

Relative pronouns, in addition to being substitutes, relate and join one sentence to another, as *who, which, what, that*.

Pronouns used in asking questions are called interrogative pronouns, as *who? which? what?*

Geography.

2. The following are the chief mountain-ranges and peaks of Scotland:—

(*a*) The Northern Highlands, north of Glenmore, containing Ben Attow, 4000 feet; Ben More, 3250 feet; and Ben Wyvis, 3400 feet.

(*b*) The Grampian Mountains, north of the Clyde and Tay, and stretching across the island from N.E. to S.W., containing Ben Nevis, 4400 feet, the highest mountain of the British Islands, Ben Macdui, 4300 feet, Cairngorm, 4100 feet, Cairntoul, 4200 feet, Schiehallion, and Ben Lomond.

(*c*) South of the Grampians are the Ochil Hills, Sidlaw Hills, and Campsie Fells, all upwards of 2000 feet high.

(*d*) The Lammermuir Hills, Moorfoot Hills, and the Pentland Hills are south of the Forth Basin.

(*e*) The Cheviot and Lowther Hills stretch across the southern part of the country and rise to upwards of 2600 feet.

The chief rivers are:—

NAME.	SEA.	TOWNS.
Tweed	North Sea	Berwick, Kelso, Peebles.
North Tyne	,,	Haddington.
Forth	,,	Musselburgh, Leith, Edinburgh, Dysart, Kirkcaldy, Alloa, and Stirling.
Eden	,,	St. Andrew's, Cupar.
Tay	,,	Dundee, Perth.
S. Esk	,,	Montrose, Brechin.
Dee	,,	Aberdeen, Ballater.
Don	,,	Old Aberdeen, Inverurie.
Deveron	,,	Banff.
Spey	,,	Fochabers.
Lossie	,,	Elgin.
Findhorn	,,	Forres.
Ness	,,	Inverness.
Clyde	Firth of Clyde	Lanark, Hamilton, Renfrew, Glasgow, Port Glasgow, Dumbarton, and Greenock.
Irvine	,,	Irvine.
Ayr	,,	Ayr.
Girvan	,,	Girvan.
Dee	Solway Firth	Kirkcudbright.
Nith	,,	Dumfries.
Annan	,,	Annan.

3. Ireland is divided into four provinces and subdivided into 32 counties, viz., Ulster (9), Leinster (12), Munster (6), and Connaught (5).

The people of Connaught are engaged almost solely in agriculture (cattle rearing and potato growing), and in fishing.

Leinster and Munster are also agricultural provinces; cattle, swine, and poultry are reared in great abundance, and in the drier parts wheat and oats are grown.

In Ulster flax is grown, and the people are engaged in its manufacture in Belfast, Newry, Louth, and Drogheda. Cotton is also manufactured in Belfast, and woollen by the peasants.

The rivers and lakes abound in fresh-water fish, which are caught and exported.

History.

1. *Julius Cæsar*, Emperor of Rome, the conqueror of Gaul, and the first invader of Britain, B.C. 55 and 54.

Julius Agricola, general employed in subjugation of Britain, A.D. 78-84; defeated Caledonians at the Grampians, and circumnavigated the island.

Caractacus, a British chief who strongly resisted the Roman invasion at the head of the Silurians, who was taken prisoner and sent to Rome.

Boadicea, Queen of the Iceni (dwelling in Norfolk and Suffolk), who had been scourged by the Romans. She raised her tribe in rebellion against the Romans, and burnt Colchester, Verulamium, and London. Died from poison, A.D. 61.

Adrian, Emperor of Rome, who visited Britain in A.D. 120, and connected the Tyne and Solway by a ditch and rampart.

Gregory, Pope of Rome (590), who sent missionaries to Britain.

Augustine, the monk who was at the head of the party of priests sent by Gregory, A.D. 597.

Dunstan, Abbot of Glastonbury, who exercised great power in the reigns of Edmund, Edwy, and Edgar, Saxon kings.

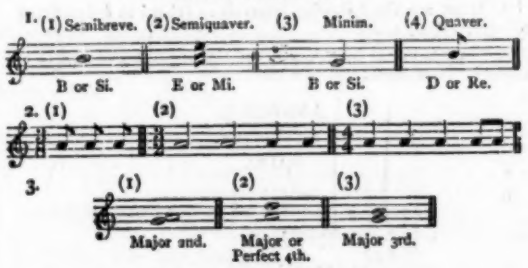
2. *Edred* (946-955) succeeded his brother Edmund on the throne, and took as his chief adviser Dunstan, who had been driven from Athelstan's court by the jealousy of his companions, but who had been restored to favour by Edmund, and made by him Abbot of Glastonbury. Edred succeeded in driving out the last Danish king of Northumbria, and placing Oswulf at the head, giving him the title of earl. Edred left no children, and was succeeded by

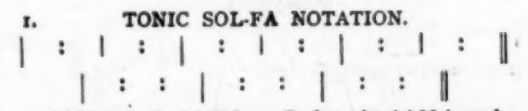
Edwy (955-959) his nephew, and the eldest son of Edmund. This short reign was full of trouble. The tribes north of the Thames were jealous of the power of Wessex, and religious reforms led to great disputes. Dunstan sided with the monks, who wanted to reform the monasteries, while Edwy was in the hands of the secular priests, who objected to reform. Dunstan was driven from the country, and Edwy it is said was forced to divorce his wife Elfgifu. The country north of the Thames revolted, and Edwy's short reign came to a close in 959.

3. The Romans had subdued the Britons, and the latter had begun to learn the arts of civilisation. They had been taught better methods of agriculture, and to work in metals, to build better houses, and generally to practise the arts of peace. The people were less warlike and unable to cope with the fierce invaders from the north, especially as considerable numbers of the young men had been sent into the Roman armies abroad. Roads had been constructed, towns built, and general advancement had been made. The whole of the 350 years of the occupation had produced great changes for the better in the country and the people.

Music.

A quarter of an hour allowed for this paper.

OLD NOTATION.

1. TONIC SOL-FA NOTATION.



2. (1) Major 2nd; (2) Major or Perfect 4th; (3) Major 3rd.

3. That the sound A in the ordinary scale is to be the tonic (*doh*) of the music to be sung or played. Sound *A* on an *A* tuning-fork and call it *doh*; or, find *A* by means of a *C* fork and call it *doh*.

SECOND YEAR.

Pupil Teachers at end of ecnd Year.

FIRST PAPER.

Three hours and a half allowed.

Euclid.

MALES.

[All generally understood abbreviations for words may be used, but not symbols of operation, as −, +, ×].

(*Answer two questions, including No. 3, if you can.*)

1. If two angles of a triangle are equal to one another, the sides which subtend or are opposite to the equal angles are equal to one another.
2. If one side of a triangle be produced, the exterior angle is greater than either of the two interior opposite angles.
3. In the figure of the fifth proposition of the First Book of Euclid, if BG and CF cut each other at H, prove that the line AH bisects the angle BAC.

Arithmetic.

FEMALES.

1. Simplify $\frac{\frac{3}{7}+\frac{5}{14}-\frac{3}{28}}{2\frac{1}{2}-1\frac{1}{4}}$ of $6\frac{1}{2}$ of $\frac{5}{13}$ of 1 cwt. 2 qrs.
2. What sum of money divided by $3\frac{3}{5}$ will give $7\frac{1}{2}$s. as quotient?
3. What is the difference between $\frac{3}{5}$ £ − $\frac{1}{4}$ of 2s. 6d. + $\frac{1}{2}$ of a crown and $\frac{3}{5}$ of a guinea − $\frac{3}{5}$ of 27s. + $\frac{5}{12}$s. of a shilling?
4. Reduce $\frac{3}{5}$ of $\frac{5}{8}$ of $\frac{4}{7}$ to a decimal.

Grammar.

MALES AND FEMALES.

'Slaves *cannot breathe* in England: if their lungs
Receive our air, that *moment* they are *free;*
They touch our country, and their shackles fall.
That's noble and *bespeaks* a *nation proud*
And jealous of the blessing.'

1. Paraphrase and analyse the above passage; and parse the words in italics.
2. What is the meaning of the prefixes in the following words:—Contradict, transport, syllable, produce, prevent, relative, succeed, abstract, extraction, intransitive?
3. Point out the affixes in the following and give other words with similar terminations:—auditor, testatrix, devotee, article, decency, assistance, ardour, magnify, terrific, fervid.

Geography.

(*Answer two questions and draw one map.*)

1. Draw a map of one of the following:—
   (*a*) France.
   (*b*) Spain and Portugal.
   (*c*) The Mediterranean Sea.
2. Name the mountain ranges of Europe, and describe their position.
3. What are the chief physical features of Spain and Portugal?
4. State briefly what you know of Lyons, Marseilles, Brussels, The Hague, Bergen, Ladoga, Po.

SECOND PAPER.

Two hours and a half allowed.

Needlework.

FEMALES.

Set in a triangular patch in flannel about 3 inches each way, and darn 6 rows as if for a thin place.

Arithmetic.

MALES.

1. At what rate will the interest of £2063 15s. amount to £46 8s. 8½d. in a year?
2. Find the discount on a bill for £421 4s. 2d. due in $3\frac{1}{2}$ mos. at $4\frac{1}{2}$ per cent. per annum.
3. Three boys with 40, 72, and 96 marbles respectively played together, and won 104 marbles, agreeing to divide the gains proportionally. What share will each receive?
4. Find the time in which 13 men would earn £52, working 8 hours a day, if 26 men earn £104 in 5 days, working 10 hours a day.

History.

1. What events took place at the following dates:—1314, 1346, 1356, 1415, 1485? Give an account of the third.
2. Write a short sketch of the reign of Henry II.
3. What were the grounds of the claim of the Yorkists to the throne of England?

Teaching.

What are the points you would try to secure in giving a reading lesson? How are they to be attained?

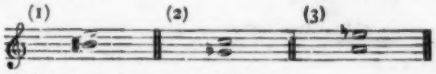
Music.

A quarter of an hour allowed for this paper.

Answer the questions in Old Notation, or Tonic Sol-fa, *not both*.

OLD NOTATION.

1. Write the key-signatures of the following:—(1) A♭; (2) A; (3) D; (4) D♭.
2. Write above each of the following intervals its name (minor 2nd, &c.):—



3. Add time-signatures to the following:—

TONIC SOL-FA NOTATION.

1. What are the names of the following intervals:—(1) *ta* to *me*; (2) *fe* to *doh*'; (3) *lah* to *ma*?
2. What are the mental effects of *doh*; *me*; and *soh*?
3. Write a six-pulse tone, using two-pulse measure.

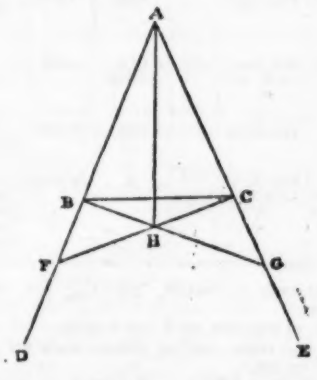
ANSWERS—SECOND YEAR.

FIRST PAPER.

Euclid.

MALES.

1. Euclid, Book I., Prop. 6.
2. Euclid, Book I., Prop. 16.



3. By Prop. 5 it is proved that the angle BCF = ∠ CBG;
∴ in the △ BHC the side HB = side HC (I. 6.)
∵ in two △'s ABH, ACH, AB = AC and AH is common,
∴ two sides AB, AH = two sides AC, AH, each to each, and the base BH = base CH,
∴ the ∠ BAH = ∠ CAH (I. 8), and the ∠ BAC is bisected by the straight line AH.

Q.E.D.

Arithmetic.

FEMALES.

1. $\frac{\frac{3}{7}+\frac{5}{14}-\frac{3}{28}}{2\frac{1}{2}-1\frac{1}{4}}$ of $6\frac{1}{2}$ of $\frac{5}{13}$ of 6 qrs.

$$= \frac{32+10-3}{\frac{28}{\frac{15-7}{6}}} \times 3\tfrac{1}{2} \times \tfrac{4}{15} \times \tfrac{1}{2}$$

$$= 7\tfrac{1}{2} \times \tfrac{1}{2} \times 3\tfrac{1}{2} \times \tfrac{4}{15} \times \tfrac{1}{2}$$

$$= \tfrac{21}{16} \text{ qrs.}$$

$$= 20 \text{ qrs. } 25 \text{ lbs.}$$

$$= 5 \text{ cwt. } 0 \text{ qr. } 25 \text{ lbs.} \quad \text{Ans.}$$

2. Here divisor is $3\frac{1}{2}$ and quotient $7\frac{1}{2}$s. Therefore dividend will be

$$= 7\tfrac{1}{2} \times 3\tfrac{1}{2}$$
$$= \tfrac{15}{2} \times \tfrac{7}{2}$$
$$= \tfrac{105}{4}$$
$$= 25\tfrac{1}{4}\text{s.}$$
$$= £1\ 5\text{s. } 9\tfrac{1}{4}\text{d.} \quad \text{Ans.}$$

3. $\frac{3}{4}£ - \frac{1}{2}$ of 2s. 6d. $+ \frac{1}{2}$ cr., $\frac{2}{3}$ gui. $- \frac{2}{5}$ of 27s. $+ \frac{1}{10}$s.
$= 13\text{s. } 4\text{d.} - 1\text{s. } 6\tfrac{1}{2}\text{d.} + 1\text{s. } 3\text{d.}, \quad 12\text{s. } 7\tfrac{1}{2}\text{d.} - 6\text{s.} + 3\tfrac{1}{2}\text{d.}$
$= 13\text{s. } 0\tfrac{1}{2}\text{d.}, \quad 6\text{s. } 10\tfrac{1}{2}\text{d.}$

$$\text{Diff.} = 6\text{s. } 1\frac{25-8}{20}\text{d.}$$
$$= 6\text{s. } 1\tfrac{17}{20}\text{d.} \quad \text{Ans.}$$

4. $\frac{2}{7} \times \frac{3}{4} \times \frac{5}{7}$
$= \frac{30}{196}$
$= .285714.$ Ans.

Grammar.

Sentence.	Kind of Sent.	Connective.	Subject.	Predicate.	Object.	Extension.
(*a*) Slaves cannot breathe in England;	Prin. Sent.		slaves	cannot breathe		in England (place)
(*b*) if their lungs receive our air,	Adv. Sent. cond. to *c*.	if	their lungs	receive	our air	
(*c*) that moment they are free.	Prin. Sent.		they	are free		that moment (time)
(*d*) They touch our country,	Prin. Sent.		they	touch	our country	
(*e*) and their shackles fall.	Prin. Sent. co-ord. with *d*.	and	their shackles	fall		
(*f*) That's noble,	Prin. Sent.		that	is noble		
(*g*) and bespeaks a nation proud and jealous of the blessing.	Prin. Sent. co-ord. with *f*.	and	it	bespeaks	a nation proud and jealous of the blessing	

Can—aux. verb to *breathe*, indicating pot. mood, pres. tense.
not—adv. of negation, mod. *can breathe*.
breathe—reg. trans., used as intrans. verb, act, inf., pres., gov. by *can*.
can breathe—reg. intrans. verb, act., pot., pres., 3rd, plur., agreeing with its nom., *slaves*.
receive—reg. trans. verb, act., cond., pres., 3rd, plur., agreeing with its nom., *lungs*.
moment—abs. noun, neut., sing., obj., gov. by *at*, und.
free—adj. of qual., qual. *they*.
that—rel. pro., agreeing with antecedent, the sentences preceding, neut., sing., 3rd, nom. to *is*.
is—irreg. intrans. verb, act, ind., pres., 3rd, sing., agreeing with *that*.
noble—adj. of qual., qual. *that*.
bespeaks—irreg. trans. verb, act., ind., pres., 3rd, sing., agreeing with it, und.
nation—com. noun, neut., sing., obj., gov. by *bespeaks*.
proud—adj. of quality, qual. *nation*.

2.

contradict	:	*contra*, against.
transport	:	*trans*, across, over.
syllable	:	*syn*, with.
produce	:	*pro*, forth.
prevent	:	*pre*, before.
relative	:	*re*, back.
succeed	:	*suc* (sub), under.
abstract	:	*abs*, from or away.
extraction	:	*ex* out of.
intransitive	:	*in*, not, and *trans*, across or over

3. Auditor; *or*, author, actor, factor.
testatrix; *trix*, executrix, administratrix.
devotee; *ee*, legatee, nominee.
article; *icle*, cubicle, canticle.
decency; *cy*, clemency, secrecy.
assistance; *ance*, abundance, vigilance.
ardour; *our*, honour, humour.
magnify; *fy*, deify, gratify.
terrific; *ic*, horrific, soporific.
fervid; *id*, timid, horrid, acid.

Geography.

2. The mountains of Europe occupy the north and the south of the continent. The southern range extends from Spain to Turkey, and includes the Pyrenees between France and Spain, with Maladetta 11,000 feet; the Alps, extending from the Mediterranean Sea through Switzerland and Italy, the south of Austria to Turkey, and going under the names of the Maritime Alps, Carnic Alps, Rhetian Alps, Dinaric Alps, the chief heights being Mont Blanc, 15,732 feet, and Mt. Rosa, 15,200 feet; the Apennines running down Italy, the Carpathians in Austria, and the Balkans in Turkey.

The northern range runs from the N. to S. of Scandinavia, and goes by the various names of Dovre Field, Hardanger Field, and the Koelen Mts.

Besides these two mountain ranges, Spain has several detached ranges, crossing it from E. to W., and the Caucasus Mts. separate Russia from Turkey in Asia in the S.E. of Europe.

3. Spain and Portugal form a great peninsula in the S.W. of Europe, surrounded on all sides except the north-east by the sea; the Bay of Biscay being on the N., the Atlantic on the W., and the Mediterranean on the E. The surface consists of a great plateau of considerable elevation, crossed by the mountain ranges, the Castilian Mts., Sierra Morena, Sierra Nevada, Sierra del Toledo; the first-named being called Sierra del Estrella, and the second Sierra Manchique in their continuation through Portugal. The plateau is bounded on the N. by the Asturias Mts., which is a continuation of the Pyrenees, which separate Spain from France, and the highest point of which is Maladetta, 11,000 feet. The lateral valleys formed by these ranges are drained by the Douro, Tagus, Guadiana, and Guadalquivir, while the eastern slope is drained by the Ebro into the Mediterranean Sea. Spain has an unbroken coast, and the only islands belonging to it are the Balearic Isles and Leon in the Mediterranean Sea.

4. *Lyons* is at the juncture of the Rhone and Saone, and is the largest and first manufacturing town of France. It is engaged in the silk trade.

Marseilles, the first port of France; on the Mediterranean Sea to the W. of the mouth of the Rhone.

Brussels, the capital of Belgium on the Spree, a trib. of the Rhine. Elegant and well-built; manufacture of lace.

The Hague, the political capital of Holland, 30 miles from Amsterdam and 14 N.W. of Rotterdam at the mouth of the Rhine.

Bergen, the second town of Norway at the head of an extensive fiord; shipbuilding, and export of dried fish.

Ladoga, the largest lake (6000 sq. m.) of Europe, situated N.E. of St. Petersburg.

Po, the longest river of Italy, draining the S. slope of Alps, and emptying itself into the Gulf of Venice.

SECOND PAPER.

Arithmetic.

MALES.

1. Interest on £2063 15s. for a year at one per cent.

$$= \frac{£2063\ 15\text{s.}}{100} = £20\ 12\text{s. } 9\text{d.}$$

$$\therefore \text{£}20\ 12\text{s.}\ 9\text{d.} : \text{£}46\ 8\text{s.}\ 8\tfrac{1}{4}\text{d.} :: \overset{\text{p.c.}}{1} : \underline{\overset{\text{p.c.}}{2\tfrac{1}{2}}}$$ Ans.

2. £100 would produce in the given time

$$\frac{3\frac{1}{2}}{12} \text{ of } 4\tfrac{1}{2} = \tfrac{7}{24} \times \tfrac{3}{2} = \tfrac{21}{16}\text{£}$$

$$\therefore \text{£}100\tfrac{11}{16} : \tfrac{21}{16} :: \text{£}421\tfrac{7}{16} : \underline{\text{£}5\ 3\text{s.}\ 1\tfrac{243}{1792}\text{d.}}$$ Ans.

3. $40+72+96=208$.

$$\left.\begin{array}{l} 208 : 40 :: 104 : \underline{20} \\ 208 : 72 :: 104 : \underline{36} \\ 208 : 96 :: 104 : \underline{48} \end{array}\right\}$$ Ans.

days days

4. £104 : 52 :: 5 : $6\tfrac{1}{2}$. Ans.

13 : 26

8 : 10

History.

1. 1314. Battle of Bannockburn.
1346. Battle of Crecy, won by Edward III. and Black Prince.
1356. Battle of Poictiers. King of France taken prisoner by Black Prince.
1415. Battle of Agincourt. Defeat of the French by Henry V.
1485. Battle of Bosworth Field in Leicestershire. Defeat of Richard III. and accession of Henry VII.

In 1356 the Black Prince made a raid upon Poitou and Languedoc, and encountered near Poictiers a large army led by the King of France. The battle was fought on the 19th September. Adopting the plan employed at Crecy, Edward posted his archers behind the hedges which bounded a narrow lane, in charging up which the French were thrown into confusion. They rallied again, however, and the battle was long and obstinate, but resulted in the capture of the French king and the overthrow of his army. John was brought prisoner to England, where he remained till he was ransomed.

2. Henry II. was a powerful prince and an energetic ruler. He reduced the barons to subjection, and recovered the northern counties of England soon after his accession. William the Lion, king of Scotland, was taken prisoner in 1174. During the latter part of his reign Henry had considerable trouble with his sons, and was so affected by his son John's rebellion that he died in 1189. During the early part of his reign he gave permission for some of his barons to assist the king of Leinster in his quarrels with his neighbours. From this invasion by the English came the conquest of Ireland.

In 1162 he appointed Thomas a'Becket Archbishop of Canterbury, for the purpose of assisting him to secure reforms in the church, by bringing the clergy under the dominion of the secular courts. For this purpose the Constitutions of Clarendon were drawn up, to which Becket at first agreed, but afterwards dissented. Fearing Henry's anger he fled to France. After six years of exile he was recalled, but on the expression of a wish for his removal, was killed by some knights. Henry afterwards did penance at his tomb.

3. Edward the Third had seven sons, and the House of York claimed the crown, as being the descendants of Lionel, Duke of Clarence, the third son of Edward, whereas the Lancastrians were descended from John of Gaunt, the fourth son. Out of this quarrel for precedence arose the wars called the 'Wars of the Roses.'

Teaching.

The chief points to be secured in reading are correctness, fluency, and expression.

Correctness can only be secured by great care on the part of the teacher and scholar. Call attention to the difficult new words before beginning the lesson. See that the reading is slow, clear, and distinct. Never allow a mistake to pass without correction, which should be made by the reader, or by the class, if possible.

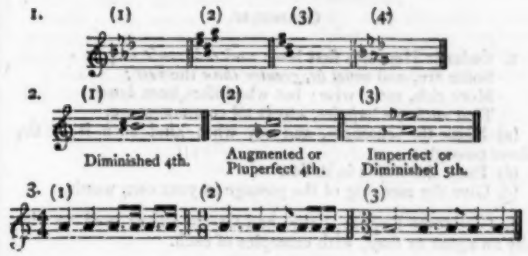
Fluency presupposes familiarity with the words and ease in their delivery. Let the mouth be well opened, much attention be given to the lessons, much practice be given, and great attention paid to the punctuation, so that opportunities for taking breath may be obtained.

Expression will usually accompany a ready and correct apprehension of the meaning of what is read. A good example must always be set, and want of proper punctuation and emphasis pointed out. Selections of dialogues, narratives, and poetry should be frequently tried. Simultaneous reading, with somewhat exaggerated expression, is sometimes useful.

Music.

OLD NOTATION.

A quarter of an hour allowed for this paper.



TONIC SOL-FA NOTATION.

1. (1) Augmented or pluperfect 4th; (2) Imperfect 5th; (3) Perfect 5th.

2. *Doh*, strong, solid, firm, impressive; *me*, calm and peaceful; *soh*, bold and grand.

(3) |1 :— |— :— |— :— ‖

THIRD YEAR.

Pupil Teachers at end of Third Year.

FIRST PAPER.

Three hours and a half allowed.

Euclid.

MALES.

[All generally understood abbreviations for words may be used, but not symbols of operation, as +, −, ×.]

(*Answer two Questions, including No. 3, if you can.*)

1. Straight lines which are parallel to the same straight line are parallel to each other.

2. The straight lines which join the extremities of equal and parallel straight lines towards the same parts are themselves equal and parallel.

3. If the line joining two parallel lines be bisected, all the lines drawn through the point of bisection and terminated by the parallel lines are also bisected in that point.

Algebra.

(*Answer three Questions.*)

1. Multiply $a^3+2a^2x+2ax^2+x^3$ by $a^3-2a^2x+2ax^2-x^3$.
2. Divide $-6x^4+96$ by $-3x+6$.
3. Find the simplest form of

(*a*) $\dfrac{2x-2n}{3bx} \times \dfrac{3nx}{5x-5n}$

(*b*) $\left(m+n+\dfrac{n^2}{m}\right) \div \left(m+n+\dfrac{m^2}{n}\right)$

Find the value of x in the following equations :—

(*a*) $\dfrac{x}{a} - \dfrac{dx}{c} + 3ab = 1.$

(*b*) $\dfrac{x+1}{3} - \dfrac{x+4}{5} = 16 - \dfrac{x+3}{4}$

(*c*) $\dfrac{x-4}{4} : x-5 :: 8 : 16.$

Mensuration.

Find the area of a triangular piece of ground whose sides are 15, 25, and 30 yards respectively.

Arithmetic.

FEMALES.

1. If a bankrupt can pay only £2,040 out of a total indebtedness of £6,450, what will his creditors lose in the £?
2. Divide ·02648205 by ·049, and add 7·375 to the quotient.
3. What is a circulating decimal? How is it converted into a vulgar fraction? Is it known by any other name? Turn ·69 and ·09 into vulgar fractions, and express their difference as a decimal fraction.
4. What decimal of 5 cwt. 1 qr. 12 lbs. is 3 cwt. 3 lbs.?

Grammar.

1. Order is Heaven's first law; and *this confessed*,
Some are, and *must be, greater than* the *rest*;
More rich, more wise; but who infers from *hence*
That *such* are happier, *shocks* all common-sense.

(*a*) Name the sentences, and say what kind each is in the above passage.
(*b*) Parse the words in italics.
(*c*) Give the meaning of the passage in your own words.

2. Give some English, Latin, and Greek affixes used to signify an agent or doer, with examples of each.

3. Give the prefixes and their meanings in the following words:—Amphitheatre, dysentery, diagram, emphasis, parallel.

Geography.

(Answer two Questions, one of which must be a map.)

1. Draw a map of one of the following:—
(*a*) India.
(*b*) Cape Colony.
(*c*) Asia Minor.

2. What are the chief physical features and productions of China?

3. Enumerate the islands, peninsulas, and rivers of Asia.

SECOND PAPER.

Two hours and a half allowed.

Needlework.

FEMALES.

Put in a patch in print, and on it work the letter 'M.'

Arithmetic.

MALES.

1. Find the side of a square which contains 38,954 square yards. Work to two decimal places.

2. If 6,000 lbs. of iron are smelted at a furnace in 24 hours, how many tons will be smelted in 308 days at 16 hours per day?

3. How much stock must be bought at 88 in order that, by selling out when the stocks are at 90, 20 guineas may be gained? (charge ¼ brokerage).

4. The discount on a sum due 2 years hence at 5 per cent. is £30. What is the sum?

History.

MALES AND FEMALES.

1. Give a short account of the reign of Charles I.

2. Name the sovereigns of the House of Hanover, with dates.

Teaching.

Write brief notes of a lesson on 'Land and Sea Breezes.'

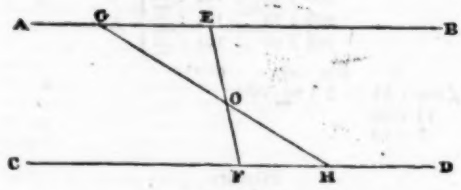
ANSWERS—THIRD YEAR.

FIRST PAPER.

Euclid.

MALES.

1. Euclid, Book I., Prop. 30.
2. Euclid, Book I., Prop. 33.



3. Let the straight line EF join the two parallel straight lines AB, CD, and let it be bisected in O. Any straight line drawn through O and terminated by AB and CD will also be bisected in O. Draw GH through O.

Because EF meets the parallels AB, CD, the alternate ∠'s AEF, EFH are equal to one another. (I. 29.)

∵ GH meets AB and CD, ∠ EGH = ∠ GHF (I. 29), and EO = OF. (Hyp.)

∴ In two △'s GOE, HOF, two ∠'s OEG and EGO = two ∠'s OFH, OHF, and one side OE = one side OF. ∴ (I. 26) the △'s are equal, and GO = OH. Wherefore GH is bisected in O.

Algebra.

1.
$$\begin{array}{l} a^3+2a^2x+2ax^2+x^3 \\ a^3-2a^2x+2ax^2-x^3 \\ \hline a^3+2a^2x+2a^1x^2+a^2x^3 \\ \quad -2a^2x-4a^1x^2-4a^2x^3-2a^2x^4 \\ \qquad +2a^1x^2+4a^2x^3+4a^2x^4+2ax^5 \\ \qquad\qquad -a^2x^3\ -2a^2x^4-2ax^5-x^6 \\ \hline a^3 \qquad\qquad\qquad\qquad -x^6. \end{array}$$ Ans.

2. $-3x^3+6)-6x^4+96($

Or, dividing by -3,

$$\begin{array}{l} x-2)2x^4-32(2x^3+4x^2+8x+16. \text{ Ans.} \\ \quad 2x^4-4x^3 \\ \quad\quad 4x^3-32 \\ \quad\quad 4x^3-8x^2 \\ \quad\quad\quad 8x^2-32 \\ \quad\quad\quad 8x^2-16x \\ \quad\quad\quad\quad 16x+32 \\ \quad\quad\quad\quad 16x+32 \end{array}$$

3. (*a*)
$$\frac{2x-2n}{3bx}\times\frac{3nx}{5x-5n} = \frac{2(x-n)}{3x(b)}\times\frac{3x(n)}{5(x-n)} = \frac{2n}{5b}.$$ Ans.

(*b*)
$$\left(m+n+\frac{n^2}{m}\right)\div\left(m+n+\frac{n^2}{n}\right) = \frac{m^2+mn+n^2}{m}\div\frac{mn+n^2+n^2}{n} = \frac{m^2+mn+n^2}{m}\times\frac{n}{m^2+mn+n^2} = \frac{n}{m}.$$ Ans.

4. (*a*)
$$\frac{x}{a}-\frac{dx}{c}+3ab=1$$
$$cx-adx+3a^2bc=ac$$
$$x(c-ad)=ac-3a^2bc$$
$$=\frac{ac-3a^2bc}{c-ad}.$$ Ans.

(*b*) $\frac{x+1}{3}-\frac{x+4}{5}=16-\frac{x+3}{4}$

$20x+20-12x-48=960-15x-45$

$23x=943$

$x=\underline{41}$. Ans.

(*c*) $\frac{x-4}{4} : x-5 :: 8 : 16$

$x-4 : 4x-20 :: 8 : 16$

Mult. extremes and means,

$16x-64=32x-160$

$-16x=-96$

$x=\underline{6}$. Ans.

Mensuration.

$\left(\frac{15+25+30}{2}\right)=35$

$35-15=20$

$35-25=10$

$35-30=5$

$35\times 20\times 10\times 5=35000$

$\sqrt{35000}=\underline{187\cdot08}$ yds. Ans.

Arithmetic.

FEMALES.

1. Total loss = £6450 − £2040 = £4410.

£ £ £ s. d.

∴ 6450 : 1 :: 4410 : $13\ 8\frac{12}{43}$d. Ans.

2. ·049)·02648205(·54045

245

198

196

220

196

245

245

7·375 + ·54045 = 7·91545. Ans.

3. A circulating decimal is one in which the same figures occur again and again without end.

If the decimal is a pure circulator, that is, one in which every figure repeats, it is converted into a decimal fraction by writing to the end of the first period for the numerator, and as many nines as there are figures circulating for the denominator.

If a mixed repeater, the figures are written to the end of the period for the numerator, minus the figures which do not circulate, and as many nines as there are figures circulating, followed by as many 0's as there are figures not circulating for the denominator.

Recurring, repeating, and infinite.

$\cdot\dot{0}\dot{9}=\frac{9}{99}=\frac{1}{11}$

$\cdot\dot{0}\dot{9}=\frac{9}{99}=\frac{1}{11}$

$\frac{1}{10}-\frac{1}{11}=\frac{11-10}{110}=\frac{1}{110}=\underline{\cdot0\dot{0}\dot{9}}$. Ans.

$\frac{3 \text{ cwt. } 3 \text{ lbs.}}{5 \text{ cwt. } 1 \text{ qr. } 12 \text{ lb.}}=\frac{339}{592}=\underline{\cdot565}$. Ans.

Grammar.

1. (*a*) (1) Princ.: Order is heaven's first law.
(2) Princ.: and some are greater.
(3) Princ.: some must be greater.
(4) Adv. of manner: than the rest [are great.]
(5) Princ. to (2) and (3): [some are] more rich.
(6) Princ.: [some are] more wise.
(7) Princ.: but [he] shocks all common-sense.
(8) Adj. to (7): who infers from hence.
(9) Noun to (8): that such are happier.

(*b*) *This*—adj. of distinction, limiting *truth* und.
confessed—past part. of 'to confess,' irreg. trans., referring to *truth*.
must—aux. to *be*, indicating pot. mood, pres. tense.
be—irreg. intrans. verb, act., inf., pres., gov. by must,
must be—irreg. intrans. verb, act., pot., pres., 3rd, sing., agreeing with its nom. *persons* und.
greater—adj. of qual., comp. deg., qual. *persons*.
than—cop. conj., joining the two sents., 'Some are greater,' and 'The rest [are great].
rest—com. col. noun, neut., sing., nom. to *are*.
hence—adv., used as abs. noun, neut., sing., 3rd, obj., gov. by *from*.
such—adj. of quality, qual. *persons*.
shocks—reg. trans. verb, act., ind., pres., 3rd, sing., agreeing with its nom. *he* und.

(*c*) If it be granted that the first and highest law of heaven is one of regularity and order, then it follows naturally that some must be greater, richer, and wiser than others; but any one who concludes that such persons are happier then their fellows, says that which is contrary to all ideas of reason and justice.

2. *English: ar*, as beggar; *er*, reader; *or*, sailor; *yer*, *ier*, sawyer, clothier; *en*, vixen; *ard*, *art*, drunkard, braggart; *ster*, punster; *man*, woodman; *woman*, fishwoman.
Latin: an, artisan; *tor*, executor; *trix*, executrix; *tress*, monitress; *ant*, *ent*, defendant, regent; *eer*, *ier*, engineer, cashier; *ee*, nominee; *ive*, captive; *iff*, plaintiff; *ary*, lapidary.
Greek: t, prophet; *te*, athlete; *ist*, sophist; *cian*, physician; *ine*, heroine; *ite*, Israelite.

3. Amphi-: roundabout.
dys-: ill.
dia-: through.
em-: in.
par-: beside.

Geography.

2. The Chinese Empire covers five and a half million square miles, of which China Proper has one and a quarter millions. It is separated generally from Siberia by the Yablonoi, the Altai, and Thian-shan mountains, and from India by the Himalaya mountains. The Khingkhan, the In-shan, and Kuen Lun mountains form an immense chain of moderate altitude through the centre of the country, while the Yun-ling and the Nan-ling occupy the south, and the Peling the district between the sources of the Hoang-ho and Yang-tsi-kiang, which are the two largest rivers, the others being the Amoor, the Peiho, and the Canton. Occupying the greater part of the north of the Empire is the Desert of Gobi or Shamo, but the S.E. is fertile and covered with an immense population. The productions are rice, millet, tea, and cotton; mulberry and camphor trees, and sugar-cane.

3. *Asia—Islands*: Cyprus, in the Levant; Rhodes, Samos, Scio, Mitylene, in the Ægean Sea; Ceylon, Laccadive, Chagos, Maldive, Andaman, and Nicobar Is. in the Indian Ocean; Hainan, Formosa, Loo Choo, Japan, Saghalien, and Kurile Is. in the Pacific; Liakhov Is. in the Arctic Ocean.
Peninsulas: Arabia, Hindostan, and Further India in the south; Corea, Kamtschatka, and Tchuktchi in the east.
Rivers: Euphrates and Tigris, forming the Shat-el-arat, flowing into the Persian Gulf; Indus, Nerbudda, and Tapty, into Bay of Bengal; Cauvery, Kistnah, Godavery, Mahanuddy, Ganges, Brahmapootra, Irrawady, and Salwen, into Bay of Bengal; Meinam and Cambodia into Gulf of Siam; Canton, Yang-tsi-kiang, Hoang-ho, Amoor, into the Pacific; Lena, Yenisei, and Obi, into the Arctic Ocean.
Continental Rivers: Tarim, into the Balkash; Oxus and Sir-daria into Sea of Aral; Kur into the Caspian; Jordan into Dead Sea.

SECOND PAPER.

Arithmetic.

MALES.

1. 38954 (197·36 .. yds. Ans.

1

29) 289

261

387) 2854

2709

3943) 14500

11829

39466) 267100

236796

30304

2. 308 × 16 = 4928 hrs.

hrs. hrs. lbs. lbs.

24 : 4928 :: 6000 : 1,232,000

1,232,000 lbs. = 550 tons. Ans.

3. Buying price = 88¼.
Selling price = 89¾.
Gain by purchasing £100 stock = £1½.
£1½ : £21 :: £100 : £1400. Ans.

4. £100 would yield in given time £5 × 2 = £10.
Debt = £100 + £10 = £110.
∴ £10 : £30 :: £110 : : £330. Ans.

History.

1. Charles I. reigned from 1625 to 1649. Soon after his accession he married Henrietta Maria, of France. Inheriting his father's principles, a struggle commenced immediately with the Parliament, which pleaded for the removal of Buckingham, and redress of grievances. A war on behalf of French Protestants caused him to summon a third Parliament (two having been dissolved), which obtained his assent to the Petition of Right. Charles levied tonnage and poundage without permission, and the Commons condemned him in three resolutions, for which Sir John Eliot and others were sent to prison, and Parliament was dissolved. Laud, Archbishop of Canterbury, and the Earl of Strafford now aided the king, and the Courts of Star Chamber and High Commission exercised great rigour. To raise money a tax called Ship Money was levied, and John Hampden refused the illegal impost. The Scots rose in rebellion, and a fourth, and then a fifth Parliament was summoned. The last impeached Strafford and Laud. Reforms took place, but Charles was distrusted, and on the passing of the Grand Remonstrance, he attempted to seize the leaders of the Parliament. On his refusal to give the command of militia into the hands of Parliament, war broke out. Various battles were fought with varying success, Charles being ultimately taken prisoner, tried, condemned as a tyrant and traitor, and beheaded at Whitehall, January 30, 1649.

2. George I. - - A.D. 1714 — 1727.
George II. - - ,, 1727 — 1760.
George III. - - ,, 1760 — 1820.
George IV. - - ,, 1820 — 1830.
William IV. - - ,, 1830 — 1837.
Victoria - - ,, 1837.

Teaching.

Introduction. If near the sea, elicit fact of breeze blowing to or from land according to the time of day. If not, state the fact, after using illustration of boy before fire—*breeze blowing towards the heat.*

Land and sea as absorbers of heat compared. Compare land and sea on hot summer's day. Land hot; sea delightfully cool; why? Also land and sea in winter; land frozen, sea warm. Conclusion from this—Water, even temperature; land has great heat or cold.

Effects of heat produced by land being a good absorber. Sun's says rapidly absorbed; land heated; air heated; expands; is rarefied (explain), equilibrium destroyed. Result, cold currents. Whence? From sea.

Land and sea as radiators compared. Land parts with heat more rapidly than water; is a better radiator (explain). Hence, on setting of sun, land cools rapidly, becomes colder than water; air on it becomes colder, more dense than on sea; therefore flows towards the sea.

Results. Temperature of land moderated, excessive heat lessened, and cold prevented by these breezes.

Owing to the great pressure on our space this month, the Reviews are unavoidably held over.

MURBY'S POPULAR EDUCATIONAL WORKS

Murby's Imperial Reading Books. New and greatly improved Editions in pink cloth.

Book I. 128 pp., 9d.	Book III. 160 pp., 10d.
,, ,, Cheap edition, 7d.	,, IV. 192 pp., 1s.
,, II. 128 pp., 9d.	,, V. 256 pp., 1s. 4d.

Ask for Pink Cloth Edition.

Murby's Excelsior Reading Books. Primer, 64 pp. Price 4d. and 3d.

Book I. 128 pp., 6d. and 4d.	Book III. 160 pp., 8d. and 6d.
,, 64 pp., 4d. and 3d.	,, IV. 224 pp., 1s. and 8d.
Book II. 128 pp., 7d. and 5d.	,, V. 256 pp., 1s. 2d. and 10d.
,, 96 pp., 6d. and 4d.	,, VI. 320 pp., 1s. 4d. and 1s.

Murby's Imperial Copy Books. The very best in the market in point of style, printing, paper, etc. Adopted in all good schools. Seventeen numbers, 2d. each.

Standards	I.	II.	III.	IV.	V.	VI.
Books	1, 2.	3, 3½, 4.	5, 5½, 6, 6½.	7, 7½, 8.	9, 10.	11, 12, 12½.

Murby's Standard Poetry for Recitation.
Standard I., 16 pp., price 1d. | Standard II., 16 pp., price 1d.
Standard III., 24 pp., price 1½d.

Murby's Memory Work Sketch Maps. Size 26 by 20. In bold design. England - Thames basin, Severn basin, Trent and Ouse basins, on mount, 3s. 6d.

Murby's Imperial Grammar. Adapted expressly for the Code.

Standard II., 16 pp., 1d.	Standard IV., 32 pp., 2d.
Standard III., 16 pp., 1d.	Standards V. & VI., 48 pp., 3d.

Standards V., VI., and VII., 80 pp., 6d.
Complete, cloth limp, 10d. Boards, 1s.
Each Part may be had in cloth at 1d. each extra.

Langton's Examples. Adapted to the Code of 1884.

Standard I. 24 pp., price 1½d.	Standard V. 24 pp., price 1½d.
Standard II. 24 pp., price 1½d.	Standard VI. 24 pp., price 1½d.
Standard III. 24 pp., price 1½d.	Standard VII. 24 pp., price 1½d.
Standard IV. 24 pp., price 1½d.	

Complete, cloth 10d.; or with Answers, 1s. 4d.

Answers to Langton's Examples. Price 2d. each Standard.

Rapid Computation. A new course of Mental Arithmetic. By J. BAINES, B.A. (Lond.). With introductory stages and Hints on Method. By J. J. PRINCE. Standards I. and II., price 1d. Standard III., price 1d. Standard IV., 1½d. Standards V. and VI., 3d.

Murby's Algebra for Beginners. Pronounced by all to be the best of its kind. New Edition. Up to Quadratic Equations. By W. DODDS. Price 10d. With Answers, 1s. 4d. Stages I. and II., 2d. each; III., 6d. Answers, price 6d.

Murby's Acme Drawing Cards, for First Grade Freehand, have produced most excellent results. Sets A, B, C, D, E, F, price 1s. each (30 cards).

Murby's Geometrical Tests. First Grade. In packets of 60 papers, for 1s. Series I. contain sheets A, B, C,; Series II., sheets D, E, F.

Nearly Ready.

Designs for Freehand, and with the Rules for Standard VII. By WADEY.

Geometrical Drawing for Standard IV. Price 1d.

LONDON: THOMAS MURBY, 3, LUDGATE CIRCUS BUILDINGS, E.C.

DARLOW & CO.'S
IMPROVED PATENT MAGNETINE CURATIVE APPLIANCES

These Appliances are recommended and used by the Profession for the Cure of

Gout	Asthma	Chest Weakness	Sore Throat
Sciatica	Rheumatism	Spinal Affections	Heart Affections
Lumbago	Rheumatic Gout	Bronchitis	Liver Complaint
Neuralgia	Lung Affections	Winter Cough	General Debility

And every other form of Nervous and Rheumatic Affection.

TESTIMONIAL.—The Rev. J. CHARLESWORTH writes: 'Will you be good enough to forward one of your Chest Protectors? I have worn one during several winters with great benefit.'

LUNG INVIGORATORS.

25/-, 30/-, and 35/- each.

[Pamphlet Post-free.

DARLOW & CO., 443, WEST STRAND, LONDON, W.C.

Possessing all the Properties of the Finest Arrowroot,

BROWN & POLSON'S CORN FLOUR

Is a Household Requisite of constant utility,

For the NURSERY, the FAMILY TABLE, and the SICK ROOM,

NOTE.—*Purchasers should insist on being supplied with* **Brown & Polson's Corn Flour.**

Inferior kinds, asserting fictitious claims, are being offered for the sake of extra profit.

The 'Practical Teacher' Sale and Exchange Column.

Owing to numerous requests, we have been induced to start this Exchange Column for the benefit of our readers. We shall be glad to insert announcements relating to the 'Sale or Exchange' of books, etc., at the rate of ONE PENNY PER LINE, *prepaid.*

What offers for Vol. II. of PRACTICAL TEACHER? Good condition.—E. C. Robin, Manor Park, Essex.

'Encyclopædic Dictionary' (Cassell). The best and most modern published. What offers for the 24 one-shilling numbers (2 vols.) issued to December?—W. J. P., 24, Lawrence Hill, Bristol.

For sale or exchange:—Smith's 'Principia Latina,' Part I. (new); 'Initia Græca,' Part I.; 'Subsidia Primaria,' Parts I. and II.; Virgil's 'Æneid,' Book II. (new); Gasc's 'Iphigenie' (new); Snaith's Geology; Angell's Physiology; Ahn's First French Course; Tate's Exercises in Mechanics. Lot sent for 10s., carriage paid.—C. L'Estrange, c/o Mrs. Callow, East Street, Alresford, Hants.

For sale:—Ewing's Geography and Astronomy (4s. 6d.) for 1s. 6d.; Cornwell's Geography and Atlas (5s. 6d.) for 2s.; Hunter's English Grammar (2s. 6d.) for 1s.; Cornwell's Young Composer (1s. 6d.) for 9d.—Mr. Watson, Carlton Colville, Lowestoft.

For sale:—Hamblin Smith's Euclid, 1s. 9d.; Key to ditto, 4s. 9d.; Capel's Catch Questions in Arithmetic and Mensuration, 2s. 3d.; Jackson's Practical Arithmetic, 2s.; Angel's Plane and Solid Geometry, 2 vols., 5s. 6d.; Pinkerton's Trigonometry, 1s. 3d. All new. No post-cards.—Apply, T. McLeod, 57, Great Ormond Street, London, W.C.

For Sale:—Mansford's Arithmetic, quite new, 3s.; Bakewell's Geology, quite new, 1s.; Newsholme's Hygiene, as new, 1s. 3d.; Cleland's Animal Physiology, 1s.; many other science books, cheap. All post free, and in good condition. Microscope, in box, almost new (value 50s.), approval, 19s. 6d. Collins' Student's Atlas, 3s. 6d.; Ever's Arithmetic, 1s. 9d.; Hamblin Smith's Euclid, 2s. 3d.; Maunder's Treasury of Geography, 3s.; PRACTICAL TEACHER, Vol. II., 3s.; PRACTICAL TEACHER (Vol. I.) three copies No. 1, and two copies No. 2.—Address, G. T., 1, Vine Villas, Victoria Road, Wanstead, Essex.

FOR FULL DETAILS OF

W. & A. K. Johnston's Wall Maps,
W. & A. K. Johnston's Atlases,
W. & A. K. Johnston's Wall Illustrations,
W. & A. K. Johnston's Globes,
W. & A. K. Johnston's Miscellaneous Publications,

See their Complete Catalogue, which is posted gratis to any Address.

W. & A. K. JOHNSTON

(ESTABLISHED 1825),

Geographers to the Queen, Educational and General Publishers,

EDINA WORKS, EASTER ROAD, EDINBURGH; and
5, WHITE HART STREET, WARWICK LANE, LONDON, E.C.

EXAMINATIONS!!

THOROUGH PREPARATION. Notes, Solutions, Paraphrases. All subjects taken. Special attention to Mathematics and Arithmetic.

SCHOLARSHIP, 10s.; CERTIFICATE—Males, 15s.; Females, 12s. 6d., quarterly. Also on results.

Send for Prospectus.

TUTOR, KIDSGROVE, STOKE-ON-TRENT.

Crown 8vo, cloth, 4s. 6d.

AN EPITOME of ENGLISH GRAMMAR for the USE of STUDENTS.

Adapted to the London Matriculation Course and Similar Examinations.

By W. H. H. KELKE, M.A.

'He has struck out a new line for himself, and the student who reads carefully through the book cannot fail to obtain many new and useful ideas, and to have his powers of thinking strengthened. . . . . We like Mr. Kelke's treatment of the philological part of the subject, which should be useful to students preparing for the London Matriculation Examination.'—*Schoolmaster.*

'Some of the illustrations used to impress facts and principles on the mind of the student are remarkably happy and striking.'—*Practical Teacher.*

London: KEGAN PAUL, TRENCH & CO.

The INFANT ACTION SONG (Words and Music) and RECITATION Book, Parts I. and II., 6d. each.

The only Book of the kind Published.

'A capital collection.'—*Schoolmaster.*

'The Action Songs are accompanied by instructions which are skilfully thought out.'—*Schoolmistress.*

Part III. 'INFANT RECITATION BOOK.' 6d.

TIME TABLE FORMS for all kinds of Schools, 6½d. Commended by H.M.I.

J. MARSHALL and Co., Paternoster Row, London; J. HEYWOOD, Manchester and London; MIDLAND EDUCATIONAL COMPANY, Birmingham; SCHOLASTIC COMPANY, Bristol, and all Booksellers. Also, post free, from Mrs. HIBBERT, Infant School, St. Chad, Shrewsbury.

EYRE & SPOTTISWOODE'S

MATHEMATICAL DRAWING INSTRUMENTS,

WATER-COLOURS, OIL-COLOURS,

And all Drawing Materials suitable for Technical and Art Students:

BEST TOWN-MADE DRAWING INSTRUMENTS,

As used in Public Schools.

EYRE & SPOTTISWOODE,

London—Great New Street, Fleet Street, E.C.

TWELVE LESSONS IN MODEL DRAWING.

By WILLIAM C. THIRDE,

Head Master, Science and Art School, Elgin, N.B.

(ENTERED STATIONERS' HALL.)

Directors, Managers of Boards, and Teachers of Schools and Colleges, supplied at 4s. per dozen copies.

Second Year Certificate.

DECEMBER.

Highly successful Coaching by Correspondence. Backward Students *made* to Pass. No fee unless successful first time. Very Low terms. Enclose envelope for particulars. GEORGE HENRY SPARROW, Forest-gate, London, E.

'They come as a boon and a blessing to men,
The Pickwick, the Owl, and the Waverley Pen.'

They are recommended by 1995 Newspapers.

☞ SAMPLE BOX, WITH ALL KINDS, BY POST, 1s. 1d.

23 TO 33, BLAIR STREET, EDINBURGH.

DRAWING AND PAINTING MATERIALS.

Liberal Allowance to Schools. Send for Illustrated Catalogue, Post Free.

BRODIE & MIDDLETON,

79, LONG ACRE, LONDON.

GILL'S

WHITEHALL COPY BOOKS.

12 Nos.—6 Standards—2d. each.

'Beneath the rule of men entirely great, the pen is mightier than the sword.'

Teachers should use Gill's Whitehall Copy Books, which are renowned beyond all others for BEAUTY, SIMPLICITY, UNIFORMITY.

GILL'S

WHITEHALL LITERARY READERS

Are the only Standard Reading Books which have been specially compiled to suit the Code requirements of 1886, *and the modified conditions under which the subject must now be taught. They are extremely interesting, and most beautifully produced in every respect. Every teacher who desires a change should see them.* St. I., 9d.; St. II., 10d.; St. III., 1s.; St. IV., 1s. 3d.; St. V. (Voyages and Travels), 1s. 4d.; St. VI. and St. VII., 1s. 6d. all now ready.

USE CODE 1886.

GILL'S PENNY 'WHITEHALL STANDARD ARITHMETICS.' Seven Standards, One Penny each.

GILL'S 'WHITEHALL ENGLISH,' CODE, 1884. St. II., 2d. St. III., 3d.; St. IV., 4d.; St. V., 4d.; St. VI. and VII. 4d.

GILL'S STANDARD ATLASES. St. III., 3d.; St. IV., 4d.; St. V. 4d.; St. VI., 6d.

GILL'S GEOGRAPHICAL READERS.

THREE SERIES.

I. THE DESCRIPTIVE AND PICTORIAL SERIES. St. II., 9d.; St. III., 1s.; St. IV., 1s. 4d.; St. V., 1s. 6d.; St. VI., 2s.

II. THE WHITEHALL GEOGRAPHICAL READERS. St. I., 6d.; St., II., 7d.; St. III., 10d.; St. IV., 1s.; St. V., 1s. 4d.; St. VI., 1s. 9d.; St. VII., 2s.

III. THE 'ALBERT GEOGRAPHICAL READERS. St. I. 9d. St. II., 9d.; St. III., 1s.; St. IV., 1s. Sts. V., VI., and VII., in the Press

N.B.—The Albert Series of Geographical Readers have been produced to suit the exact conditions required by the Code, 1884-5, as to number of Lessons, etc. Every critic acknowledges that these are the finest specimens of elementary school-book production.

GILL'S HISTORICAL READERS.

THREE SERIES.

I. THE HISTORICAL READERS. In Periods. No. I., St. III., Stories, 1s.; No. II., St. IV., Early England, 1s.; No. III., St. V., Middle England, 1s. 4d.; No. IV., St. VI., Modern England, 1s. 6d.; No. V., St. VII., Standard Authors, 2s. 6d.

II. THE WHITEHALL HISTORICAL READERS. Each complete. St. III., Stories, 8d.; St. IV., Sketches, 10d.; St. V., Annals, 1s. 3d.; St. VI., Chronicles, 2s.; St. VII., Standard Authors, 2s. 6d.

III. THE 'ALBERT' HISTORICAL READERS. St. III., 60 Lessons, 1s. St. IV., 60 Lessons, 1s.

N.B.—The Albert Historical Readers have been issued, and suit the exact conditions required by the Code, 1884-5, as to number of Lessons, etc. All Gill's Readers are most beautifully illustrated.

GILL'S VICTORIA ATLAS. 101 Coloured Maps, 1s. 'The cheapest and best Atlas in the world."

GEORGE GILL & SONS, LONDON.

BORD'S PIANOS
ON SALE
WITH 25 PER CENT DISC^T FOR CASH,
OR 15^s PER MONTH ON THREE YEARS' HIRE SYSTEM,
SECOND-HAND ON 3 YEARS' SYSTEM 10/6
PER MONTH. ILLUSTRATED LIST FREE OF
PIANOS EXCHANGED Chas. Stiles & Co
42 SOUTHAMPTON ROW, HOLBORN, LONDON W.C.

Prof. Loisette's DISCOVERIES. THE PHYSIOLOGICA ART OF NEVER FORGETTING—wholly unlike mnemonics. Lost memories restored—the worst made good, and the best better. *Any book learned in one reading.* Speaking without notes. *A self-teaching method for all subjects.* Invaluable to the Legal, Medical, Clerical, & all other Professions & Businesses. The Lessons contain One Thousand Applications!!!

MEMORY AND SUCCESS.

PROSPECTUS POST FREE, with opinions of Mr. R. A. PROCTOR, Dr. ANDREW WILSON, &c. NEVER FORGETTING and CURE for MIND-WANDERING taught thoroughly by Post, in Classes, and Privately. PROF. LOISETTE, 57, New Oxford Street, London, W.C.

Just Published, price 2s.

MAGNETISM & ELECTRICITY.

For the use of Students in Schools and Science Classes; with numerous diagrams.

By H. C. TARN, F.S.Sc.

Also in separate parts—

STAGE I., price 6d.; II., price 9d.; III, price 6d.

W. & R. CHAMBERS, 47, Paternoster Row, London, and Edinburgh.

ESTABLISHED 1851.

BIRKBECK BANK.—

Southampton Buildings, Chancery Lane.

THREE per CENT. INTEREST allowed on DEPOSITS, repayable on demand.

TWO per CENT. INTEREST on CURRENT ACCOUNTS calculated on the minimum monthly balances, when not drawn below £50.

The Bank undertakes for its Customers, free of Charge, the Custody of Deeds, Writings, and other Securities and Valuables; the collection of Bills of Exchange, Dividends, and Coupons; and the purchase and sale of Stocks, Shares, and Annuities. Letters of Credit and Circular Notes issued.

THE BIRKBECK ALMANACK, with full particulars, post free, on application. FRANCIS RAVENSCROFT, Manager.

The Birkbeck Building Society's Annual Receipts exceed Five Millions.

HOW TO PURCHASE A HOUSE FOR TWO GUINEAS PER MONTH, with immediate Possession and no Rent to Pay. Apply at the Office of the BIRKBECK BUILDING SOCIETY, 29, Southampton Buildings, Chancery Lane.

HOW TO PURCHASE A PLOT OF LAND FOR FIVE SHILLINGS PER MONTH, with immediate possession, either for Building or Gardening purposes. Apply at the Office of the BIRKBECK FREEHOLD LAND SOCIETY, as above.

The Birkbeck Almanack, with full particulars, on application.

FRANCIS RAVENSCROFT, Manager.

Tuition by Correspondence.

CERTIFICATE.—The preparation established in 1871 is available as usual. The following are the fees charged for correspondence twice a week :— Per quarter. By results.

Masters: First Year.....	15s.	...	£2
,, Second Year	21s.	...	£5
Mistresses: First Year	10s.	...	£1
,, Second Year.....	15s.	...	£3

Pupils who prefer the quarterly arrangement remit the fee at the end of the quarter. Those who select 'Payment by Results' are not required to part with any money for Tuition until a pass is recorded; and, if the pupil is unsuccessful after two attempts, the agreement will be cancelled without payment.

MATRICULATION (Established 1871), Science, Drawing, Scholarship, A.C.P., Civil Service, Diocesan, Shorthand, Musical, Medical, Legal, P.T. Papers, and other branches as advertised. *No payment unless successful.*

Address, JAMES JENNINGS and Co., Tuition by Correspondence Office, Deptford, London.

'THE WHOLE OF THE BOOKS ARE WELL DONE, AND DESERVE STRONG RECOMMENDATION.'—*The Schoolmaster.*

JOHNSTON'S COPY BOOKS

THE KINDERGARTEN NUMBER IS UNIQUE.

ENTERED AT STATIONERS' HALL. ALL RIGHTS RESERVED.

ARE THE BEST.

17 Numbers, at 2d. each; Superior Edition, in plain marbled covers, at 3d. each.

See Opinions of the Profession and the Press, forwarded, with Specimen Pages, free by post on application.

A. JOHNSTON & CO., 6, Paternoster Buildings, London, E.C.

LONDON UNIVERSITY EXAMINATIONS.

A COLLEGE PROFESSOR, in conjunction with a B.A. (London), gives specially prepared Courses of Correspondence Lessons for MATRICULATION, ALL SUBJECTS, and for INTERMEDIATE MATHEMATICS. WEEKLY Notes, Hints, Questions, and Corrections. During each Course 100 to 300 Questions from previous Papers are Answered. Fee, any Subject (*e.g.*, Chemistry), Full Course, ONE GUINEA. —Address, B.Sc., 54, Nelson Square, S.E., London.

W. SHEPHERD,
CITY KINDERGARTEN DEPÔT,

30, PATERNOSTER ROW, LONDON, E.C.

Importer of every description of Kindergarten materials, of best quality only. The stock comprises all Novelties for the Season. 'Paradise of Childhood,' a Complete Guide for Self-Instruction in Froebel's Educational Principles. 74 pages of Illustrations, price 7s. 6d.

THE NEW AND IMPROVED GAME OF

SENTENCE, PHRASE, & WORD MAKING.

An instructive and entertaining method for Schools or Home use, with full directions enclosed in box. Price 1s.

To be obtained of all Booksellers and Fancy Repositories.

CIVIL SERVICE APPOINTMENTS, open to all British-born or naturalised subjects between limits of age 14-25. J. KEEFE, F.R.G.S., CIVIL SERVICE ACADEMY, 171, DUKE STREET (late at 6, Colquitt Street), Liverpool, assisted by members of H.M. Civil Service, prepares rapidly and successfully by postal tuition. Each student receives a thorough and complete course of preparation. MEN CLERKS, Successes: Preliminary, 50 places; Competitive, 15 appointments, viz., 3, 5, 19, etc.; Excise, viz., 16, 18, 20, 35, etc.; Customs, C.D.O., viz., 5, 13, 14, 16, 19, etc. Customs (departmental), Messrs. Crompton and Sobey. Out-port Clerkships, 40, 44, etc. BOY CLERKS, 8 appointments, viz., 16, 18, 26, 40, 42, etc. POST OFFICE CLERKSHIPS, 10 appointments. FEMALE CLERKSHIPS (preliminary), 6 places. The names of above candidates may be seen in J. Keefe's prospectus, free on application. Pupils took 2nd, 4th, 15th, 19th, etc., places in May Customs Examination—more successes than any other tutor or tutors.

☞ OVER 250 SUCCESSES! 10 FIRST PLACES.

DAY, EVENING, AND CORRESPONDENCE CLASSES.

THE LONDON CIVIL SERVICE COLLEGE, 27, CHANCERY LANE, LONDON.

Eight Years of Unparalleled Success. Results Unexcelled.

DEPARTMENTS—CIVIL SERVICE, LONDON MATRICULATION, QUEEN'S SCHOLARSHIP, CERTIFICATE UNIVERSITY LOCALS, SPECIFIC SUBJECTS, etc. Messrs. SKERRY, F.S.Sc., SMITH, M.A., CROMB, M.A., BARBER, B.A. (Hons.), NOTMAN (Hons.), and Co., (22 Tutors, Graduates of London, Cambridge, etc.).

Clerkships, Men (age 17-20, Salary £80-£250), 2nd, 3rd, 4th, 5th, 9th, 16th, 27th, 31st, 37th, 39th, etc.; Excise (19-22, Salary £95-£300) 5th, 6th, 8th, 9th, 10th, 11th, 12th, 13th, etc.; Customs (19-25, Salary £55-£200), 3rd, 4th, 5th, 6th, 7th, 8th, etc.; Female Clerks (18-20, Salary £55-£70, etc.), 5th, 12th, 17th, 37th, 47th, 54th, etc.; Boy Clerks (15-17, Salary £36, etc.), 3rd, 8th, 9th, etc.; Surveyors of Taxes (19-22, Salary £100-£400), 1st, 3rd, 4th, etc., Highest places at all centres throughout Great Britain and Ireland.

Civil Service Guide and Prospectus (10th Thousand) post free from Mr. Skerry, F.R.S.S.A., of H.M.C.S., 27, Chancery Lane, London, W.C. Order the

'Civil Service Competitor,'

1d. weekly, of all booksellers, or sent free for 6s. 6d. per annum. Contains latest details, with Examination Papers of all Examinations, original articles, valuable hints, etc. More information than in any similar publication.

A NEW SERIES OF COPY-BOOKS.

THE TOWNLEY COPY-BOOKS.

Adapted to Code Requirements. In 12 Nos., price 2d. each. (In the Press.)

ONE THOUSAND EVERY-DAY WORDS COMMONLY MIS-SPELT, selected from leading articles of the *Times*, *Standard*, *Telegraph*, *Daily News*, and *Morning Post*, price 1d.

A FRENCH GRAMMAR AND COURSE OF EXERCISES, in Six Steps, by A. Andrieux and L. Cooke. Steps 1 and 2 now ready, price 3d. each.

THE ARTISTIC SERIES OF REWARD CERTIFICATES. No. 1, 1s.; No. 2, 1s. 6d.; No. 3, 2s.; No. 4, 2s. 6d.; No. 5, 3s.; No. 6, 3s. 6d. per dozen. Examination Papers, with attractive Printed Headings, 2s. per 100. Samples of any of the above post free to Teachers.

A. G. DAWSON, 14, Ivy Lane, Paternoster Row, E.C.; and Pickford Street Works, Macclesfield.

HARMONIUMS, AMERICAN ORGANS, PIANOFORTES.

J. COOPER & CO.,

Scholastic Musical Instrument Manufacturers,

70, SHEPPERTON ROAD, NEW NORTH ROAD, ISLINGTON, LONDON, N.
WORKS: PEABODY YARD, ESSEX ROAD.

Sole Makers of "The Chorister" Organ (Registered). The cheapest and best organ in the world.

"The Piano you supplied *Ten Years* ago has given the most complete satisfaction.
E. Barr, C.M., St. Clement's School, Notting-hill, W.

Some *Four Years* ago you supplied me with a most beautiful American Organ, which still continues to give entire satisfaction.
E. Jones, C.M., Manledd Board School, Llanidloes.

The Harmonium I purchased *Five Years* ago is quite a credit to you; although in constant use, it keeps beautifully in tune.
E. P. Jones, C.M., Little Aston, Birmingham.

Over 6,000 similar Testimonials have been received.

NO TEACHER SHOULD DECIDE WITHOUT SEEING OUR LISTS, WHICH ARE SENT POST FREE.

COX'S
COPY BOOKS
ARE THE BEST.

PRICE 2d. EACH.

London: JOSEPH HUGHES, Pilgrim Street, Ludgate Hill.

Adopted by the Edinburgh School Board.

Mr. BERNAYS says in New Blue Book:—'Our school literature should contain such tales as those in

HUGHES'S
Standard Story-Books,

not only as affording a desirable relaxation, but as tending to foster a love of reading, and thus to create an appetite for more intellectual food.'

Very strongly bound. Beautifully Illustrated.

INFANTS	4d.
STANDARD I., ...	6d.
STANDARD II., ...	8d.
STANDARD III., ...	10d.
STANDARD IV., ...	1s.
STANDARD V., ...	1s. 6d.
STANDARD VI., ...	2s.

The Schoolmaster says:—'Admirable in every respect. The books are strongly and attractively bound, and possess the additional recommendation of cheapness. They only require to be known to be appreciated.'

London: JOSEPH HUGHES, Pilgrim Street, Ludgate Hill.

MESSRS. LONGMANS AND CO.'S EDUCATIONAL WORKS.

CLASSICS.

GRAMMAR SCHOOL TEXTS, with Vocabularies. Edited by JOHN T. WHITE, D.D.

GREEK TEXTS.

ÆSOP (Fables) and PALÆPHATUS (Myths). 1s.
HOMER, Iliad, Bk. I. 1s.
HOMER, Odyssey, Bk. I. 1s.
LUCIAN, Select Dialogues. 1s.
XENOPHON, Anabasis, Bks. I., III., IV., V., and VI. 1s. 6d. each.
XENOPHON, Anabasis, Bk. II. 1s.
XENOPHON, Anabasis, Bk. VII. 2s.
The ACTS of the APOSTLES. 2s. 6d.
ST. MATTHEW'S and ST. LUKE'S GOSPELS, 2s. 6d. each.
ST. MARK'S and ST. JOHN'S GOSPELS, 1s. 6d. each.
ST. PAUL'S EPISTLE to the ROMANS, 1s. 6d.
The FOUR GOSPELS in GREEK, with an English-Greek Lexicon. 5s.

LATIN TEXTS.

CÆSAR, Gallic War, Bks. I., II., V., and VI. 1s. each.
CÆSAR, Gallic War, Bks. III. and IV. 9d. each.
CÆSAR, Gallic War, Bk. VII. 1s. 6d.
CICERO, Cato Major (Old Age). 1s 6d.
CICERO, Lælius (Friendship). 1s. 6d.
EUTROPIUS, Roman History, Bks. I. and II. 1s.
EUTROPIUS, Roman History, Bks. III. and IV. 1s.
HORACE, Odes, Bks. I., II., and IV. 1s. each.
HORACE, Odes, Bk. III. 1s. 6d.
HORACE'S Epodes and Carmen Seculare. 1s.
NEPOS, Miltiades, Cimon, Pausanias, Aristides. 9d.
OVID, Selections from the Epistles and Fasti. 1s.
OVID, Select Myths from the Metamorphoses. 9d.
PHÆDRUS, Select Easy Fables. 9d.
PHÆDRUS, Fables, Bks. I. and II. 1s.
SALLUST, Bellum Catilinarium. 1s. 6d.
VIRGIL, Georgics. Bk. IV. 1s.
VIRGIL, Æneid, Bks. I. to VI. 1s. each.
VIRGIL, Æneid, Bks. VII., VIII., X., XI., and XII. 1s. 6d. each.
LIVY, Bks. XXII. and XXIII. Latin Text with English Notes, etc. 2s. 6d. each Book.

WHITE'S SCHOOL DICTIONARIES.

A CONCISE LATIN-ENGLISH DICTIONARY, for the Use of Advanced Scholars and University Students. Royal 8vo, 12s.

The JUNIOR STUDENTS' COMPLETE LATIN-ENGLISH and ENGLISH-LATIN DICTIONARY. Square 12mo, 5s.

The JUNIOR STUDENTS' LATIN-ENGLISH DICTIONARY. 12mo, 3s.

The JUNIOR STUDENTS' ENGLISH-LATIN DICTIONARY. Square 12mo, 3s.

PUBLIC SCHOOL LATIN PRIMER. Edited with the sanction of the Head Masters of the Nine Public Schools included in Her Majesty's Commission. 12mo, 2s. 6d.

SUBSIDIA PRIMARIA, STEPS to LATIN. Companion Exercise-Books, adapted to the Public School Latin Primer. By the Editor of the Primer. Part I. Accidence and Simple Construction, price 2s. 6d. Part II. Syntax, etc., price 3s. 6d. **KEY** to the Exercises in Parts I. and II., 12mo, price 5s. (supplied to Teachers only). Part III. Construction of the Latin Compound Sentence. 12mo, 1s.

WORKS by Canon B. H. KENNEDY, D.D.

The PUBLIC SCHOOL LATIN GRAMMAR. Crown 8vo, 7s. 6d.

An ELEMENTARY GRAMMAR of the LATIN LANGUAGE. 12mo, 3s. 6d.

The CHILD'S LATIN PRIMER, or FIRST LATIN LESSONS; adapted to the principles of the Public School Latin Primer, 12mo, 2s.

The CHILD'S LATIN ACCIDENCE. Extracted from the Child's Latin Primer. 12mo, 1s.

ELEMENTARY LATIN READING-BOOK. Adapted to the Author's Child's Latin Primer. 12mo, 2s.

CLASSICS (continued).

FARRAR'S (Archdeacon) A BRIEF GREEK SYNTAX and HINTS on GREEK ACCIDENCE, with Reference to Comparative Philology. Tenth Edition. 12mo, 4s. 6d.

FARRAR'S (Archdeacon) GREEK GRAMMAR RULES, drawn up for the Use of Harrow School. Eighteenth Edition. 12mo, 1s. 6d.

LIDDELL and SCOTT'S GREEK-ENGLISH LEXICON. Seventh Edition. Revised throughout and Improved. 4to, 36s.

LIDDELL and SCOTT'S GREEK-ENGLISH LEXICON. Abridged from the above. Twentieth Edition. Square 12mo, 7s. 6d.

BRADLEY'S LATIN PROSE EXERCISES; English Sentences translated from Cæsar, Cicero, and Livy, to be retranslated into the original. 12mo, 3s. 6d.—KEY, 5s.

BRADLEY'S LESSONS in LATIN PROSE; consisting of Rules and Exercises, and forming an Easy Introduction to the Writing of Continuous Latin Prose. 12mo, 5s.—KEY, 5s.

WORKS by Prof. WITT. Translated from the German by FRANCES YOUNGHUSBAND.

The TROJAN WAR. With a Preface by the Rev. W. G. RUTHERFORD, M.A., Head Master of Westminster School. Crown 8vo, 2s.

MYTHS of HELLAS; or, Greek Tales. Crown 8vo, 3s. 6d.

The WANDERINGS of ULYSSES. Crown 8vo, 3s. 6d.

FRENCH.

WORKS by Prof. LEON CONTANSEAU.

A PRACTICAL DICTIONARY of the FRENCH and ENGLISH LANGUAGES. Post 8vo, 3s. 6d.

A POCKET DICTIONARY of the FRENCH and ENGLISH LANGUAGES; being a careful Abridgment of the Author's 'Practical French and English Dictionary.' 18mo, 1s. 6d.

FIRST STEP in FRENCH: an Easy Method of Learning the Elements of the Language. 12mo, 2s. 6d.

MODERN FRENCH GRAMMAR; comprising Vocabularies, Conversational Lessons, and Copious Exercises. 12mo, 4s.—KEY, 3s.

GUIDE to FRENCH TRANSLATION; being a selection of Instructive and entertaining English Extracts, with Hints for their Translation into French. 12mo, 3s. 6d.—KEY, 3s. 6d.

PREMIERES LECTURES: a Selection of Stories from the best French Authors, with English Notes, followed by a few Easy Poetical Pieces. 12mo, 2s. 6d.

PROSATEURS et POETES FRANCAIS; or, Selections from the best French Authors. 12mo, 5s.

ELEMENTARY FRENCH Course. Adapted for Middle-Class Schools. 18mo.

1. Accidence, 8d.
2. Syntax, 8d.
3. Conversation Book, price 8d.
4. First Exercise Book, price 8d.
5. Second Exercise Book, price 8d.
6. Translation Book, 8d.
7. Easy Delectus, 8d.
8. First Reader, 8d.
9. Second Reader, 8d.
10. Dialogues, 8d.

The GRADUATED COURSE of TRANSLATION from ENGLISH into FRENCH. Edited by Professors CH. CASSAL, LL.D., and TH. KARCHER, LL.B. Small 8vo, in 2 volumes or parts, 5s. 6d.; or separately—Part I., Junior Course, 3s. 6d; Part II., Senior Course, 3s. 6d. Key to Part I., by Professor CASSAL, price 3s. (supplied to Teachers only).

RULES and EXERCISES on the FRENCH LANGUAGE, for the use of English Students. By L. STIEVENARD. Crown 8vo, 3s. 6d.

LECTURES FRANCAISES; or, Extracts in Prose from Modern French Authors, with copious Notes, for the use of English Students. By LEONCE STIEVENARD. 12mo, 4s. 6d.

GEOGRAPHY.

WORKS by WILLIAM HUGHES, F.R.G.S

A MANUAL of GEOGRAPHY, Physical, Industrial, Political. With Six Coloured Maps. Fcap. 8vo, 7s. 6d. Or in Two Parts—Part I. Europe, 3s. 6d. Part II. Asia, Africa, America, Australia, and Polynesia, 4s.

MANUAL OF BRITISH GEOGRAPHY; embracing the Physical, Industrial, and Descriptive Geography of England and Wales, Scotland and Ireland. With Four Coloured Maps, fcap. 8vo, 2s.

PUBLIC SCHOOLS ATLAS (The) of MODERN GEOGRAPHY, in 33 Coloured Maps. Edited, with an Introduction on the Study of Geography, by the Rev. G. BUTLER, D.D., Canon of Winchester, and formerly Principal of Liverpool College. The Maps by E. Weller, F.R.G.S. Imperial 8vo, or imperial 4to, price 5s.

PUBLIC SCHOOLS ATLAS (The) of ANCIENT GEOGRAPHY, in 28 Entirely New Coloured Maps, drawn and engraved by E. Weller, F.R.G.S. Edited, with an Introduction on the Study of Ancient Geography, by the Rev. G. BUTLER, D.D. Imperial 8vo, or imperial 4to, 7s. 6d.

PUBLIC SCHOOLS HISTORICAL ATLAS. Edited by C. COLBECK, M.A., late Fellow of Trinity College, Cambridge, Assistant-Master at Harrow School. 101 Maps and Plans (53 coloured), post 4to, 5s.

GEOGRAPHICAL STUDIES. Maps Selected from the Public Schools Atlases, 20 sheets (three sorts). Price One Penny each sheet:—

MAPS COLOURED in OUTLINE.
OUTLINE MAPS.
PROJECTION MAPS.

HISTORY.

GARDINER'S (S. R.) OUTLINE of ENGLISH HISTORY, B.C. 55 to A.D. 1880. With 96 Woodcuts and Maps. Fcap. 8vo. 2s. 6d.

MERIVALE'S (Dean) GENERAL HISTORY of ROME, from the Foundation of the City to the Fall of Augustulus, B.C. 753 to A.D. 476. With Five Maps, crown 8vo, 7s. 6d.

SCHOOL HISTORY of ROME, Abridged from Dean Merivale's General History of Rome by C. PULLER, M.A. With 13 Full-page Maps. Fcap. 8vo, 3s. 6d.

MORRIS'S (Rev. D.) A CLASS-BOOK HISTORY of ENGLAND, for Students preparing for the University Local Examinations or for the London University Matriculation, etc. With Maps and Woodcuts. Fcap. 8vo, 3s. 6d.

SEWELL'S (Miss) The CHILD'S FIRST HISTORY of ROME. Fcap. 8vo, 2s. 6d

SEWELL'S (Miss) A FIRST HISTORY of GREECE. Fcap. 8vo, 3s. 6d.

LORD MACAULAY'S WORKS.

CHEAP EDITIONS, suitable for use in Schools.

HISTORY of ENGLAND, from the Accession of James the Second. Student's Edition, 2 vols, crown 8vo, 12s.

CRITICAL and HISTORICAL ESSAYS; with Lays of Ancient Rome. Complete in 1 vol. Authorised Edition, crown 8vo. 2s. 6d.

The ESSAY on WARREN HASTINGS. Annotated by S. HALES. 1s. 6d.

The ESSAY on LORD CLIVE. Annotated by H. COURTHOPE BOWEN, M.A. 2s. 6d.

LAYS of ANCIENT ROME. Illustrated by G. SCHARF. Popular Edition, fcap. 4to, 6d., sewed; 1s., cloth.

LAYS of ANCIENT ROME. Annotated Edition. Fcap. 8vo, 1s., sewed; 1s. 6d., cloth.

NEW & RECENT PUBLICATIONS.

SERIES NOW COMPLETE. *SPECIMEN PAGES FREE.*

PHILIPS' GEOGRAPHICAL READERS.

ADOPTED BY THE LONDON SCHOOL BOARD.

1. **FIRST STEPS.** PART I., explaining 'Plans of School and Playground, the Cardinal Points, and meaning and use of a Map.' With Word-Lists and Summaries, 45 Lessons, 112 Illustrations and Maps. 128 pp., cloth, price 9d.
2. **FIRST STEPS.** PART II. 'The Size and Shape of the World, Geographical Terms simply explained and illustrated by reference to the Map of England, and Physical Geography of Hills and Rivers.' 47 Lessons and 100 Illustrations, Diagrams, and Maps. 140 pp., cloth, price 10d.
3. **ENGLAND,** Physical and Political, giving in a graphic Narrative form the 'Physical and Political Geography of England.' With 60 Lessons, 78 Illustrations, and 57 Maps, 192 pp., cloth, price 1s.
4. **BRITISH ISLES, BRITISH N. AMERICA,** AND AUSTRALIA, described in a series of well-written Sketches of Voyages, Travels, etc. 81 Lessons, 54 Maps, and 100 Illustrations. 256 pp., cloth, price 1s. 6d.
5. **EUROPE,** Physical, and Political described in a series of Narratives of Voyages and Tours. With Appendix—Latitude and Longitude: Day and Night. The Seasons, 66 Lessons, 119 Illustrations, and 19 Maps. 288 pp., cloth, 1s. 9d.
6. **THE WORLD.** A Series of Voyages and Travels in Asia, Africa, America, and Polynesia. With Appendix—Interchange of Productions: Circumstances which determine Climate. 67 Lessons, 118 Illustrations, and 35 Maps. 320 pp., cloth, price 2s.

***** These Readers contain no less than 800 fine Woodcuts and specially prepared Maps and Diagrams. No labour or expense has been spared to make the Series the best yet published.**

'All the books are crowded with good illustrations, maps, portraits, and sketches; the type is large and clear. They are altogether a decided step in advance in geographies for elementary schools under Government inspection.'—*School Board Chronicle.*

PHILIPS' STANDARD ATLASES.

STANDARD ATLAS, No. 1, for STANDARD III. 12 finely-coloured Maps, price 2d.
STANDARD ATLAS, No. 2, for STANDARD IV. 44 finely-coloured Maps, price 4d.
STANDARD ATLAS, No. 3, for STANDARD V. 35 finely-coloured Maps, price 4d.
STANDARD ATLAS, No. 4, for STANDARD VI. 31 finely-coloured Maps, price 4d.

The only Standard Atlases in which the Maps are distinctly legible and really copyable.

**** The finest Atlases for School use ever produced. Adopted by the London School Board.*

STANDARD MENTAL ARITHMETIC.

Specially prepared to meet the requirements of the MUNDELLA CODE, by T. W. PIPER. In SIX BOOKS—Standards I. to VI Fcap. 8vo, stiff covers, 1d. each.

TEACHER'S BOOK OF RULES, ANSWERS, NOTES AND HINTS FOR SOLUTIONS to the same. Fcap. 8vo. Standards II. to VI., each 3d.; Standard I., PROBLEMS AND ANSWERS only, 2d.

With these books the largest classes can be at once set to work simultaneously, and the results instantly verified. Adopted by the London School Board.

Recently Published, in neat Cloth Case, price 1s. each Standard.

THE 'CAXTON' GRAMMATICAL TEST CARDS.
THE 'CAXTON' ARITHMETICAL TEST CARDS.

For Standards II. to VII., 36 Cards for each Standard. Specially prepared for the New Code, by DAVID BAIN, F.R.G.S., St. John's College, Cambridge.

These 'Test Cards' are got up in a very superior manner, and are highly commended by experienced Teachers. They are undoubtedly the best Cards for Elementary School work, and must produce good results.

PHILIPS' HISTORICAL READERS.

New Editions, exactly adapted to the requirements of the present Code.

1. **STORIES FROM ENGLISH HISTORY.** 60 Lessons with Notes, 80 beautiful Pictures, and 4 Maps. Cloth, 1s.

These 'Stories from English History' form one of the brightest and most attractive reading-books ever published.

2. **EARLY ENGLAND,** from Pre-historic Times to 1154. 63 Lessons with Notes, 94 attractive Pictures, and 6 Maps. Cloth, 1s.

In this beautifully illustrated and well-written little book, the story of the making and founding of our nation is graphically sketched. The opening section contains vivid pen and pencil pictures of life in this country in pre-historic times—the periods of the men of the caves, the stone-hatchet men, the bronze-workers, etc.

3. **MIDDLE ENGLAND,** from 1154 to 1603. 61 Lessons with Notes, 77 Beautiful Pictures, and 16 Maps and Tables. Cloth, 1s. 6d.

In this book the history of our country is continued from the reign of Henry II., when the welding of Saxons and Normans into one compact people commenced, to the end of the reign of Elizabeth, when the modern social, political, and scientific ideas had at length been fully thought out.

4. **MODERN ENGLAND,** from 1603 to 1883. 64 Lessons with Notes, 93 attractive Pictures, and 11 Maps and Tables. Cloth, 1s. 6d.

In this book the great events of the last 280 years are graphically and succinctly described and fully illustrated.

**** The superiority of these Readers is fully proved by the fact that their introduction is invariably followed by the best results, and that they are best liked by the best Teachers.*

IMPORTANT NOTICE TO TEACHERS.

MESSRS. GEORGE PHILIP AND SON respectfully invite all interested in the IMPROVED METHODS OF GEOGRAPHICAL INSTRUCTION, to inspect their large and complete Stock of Geographical Apparatus, consisting of **Maps—Physical and Political, Diagrams, Character Pictures, Relief Models, Globes, Text Books, Atlases, etc.,** published by them. They also keep a varied Stock of all the best **Foreign Maps, Diagrams, etc.** Catalogues and Prospectuses sent free on application, from their Geographical Establishments, 32, Fleet Street, London; and 45 to 51, South Castle Street, Liverpool.

LONDON: GEORGE PHILIP & SON, 32, FLEET STREET.

16

FOR PUPIL TEACHERS' PRIZE COMPETITION see page 17.

452

THE Practical Teacher

A MONTHLY EDUCATIONAL JOURNAL.

EDITED BY JOSEPH HUGHES.

'Knowledge is proud that he has learned so much,
Wisdom is humble that he knows no more.'—COWPER.

VOL. V. No. 1. MARCH, 1885. PRICE 6d. POST FREE, 7½d.

CONTENTS.

	PAGE		PAGE		PAGE
Hygiene. By Dr. Carpenter	1	Music—'Mother's Fire'	13	Science Notes	17
The New Class Subject, 'Elementary Science.' By Richard Balchin	3	Domestic Economy. By Mrs. Wigley	14	How to Teach Drawing. By T. R. Ablett	19
Lessons in Latin. By Rev. A. D. Capel, M.A.	5	Recent Inspection Questions	16	Lectures on Shakspere's 'Tempest.' By H. M. Hewitt, M.A.	21
Merit Grant in Infant Schools. By Mrs. Mortimer	8	Prize Competition Examination Papers	17	Gossip	23
Chemistry of Non-Metallics. By Dr. Aveling	10	Query Column	21	Publications Reviewed	24
		Answers to Arithmetic in the *Scholar*	23	Re.ei.ed	48
		How to Teach History. By Isabella Landale	25		

NOTICE.—NEW STORY.

THE

CORNHILL MAGAZINE

For APRIL

WILL CONTAIN THE FIRST PART OF

A NEW STORY

ENTITLED

'COURT ROYAL.'

By the Author of 'Mehalah,' 'John Herring,' etc.

WITH ILLUSTRATIONS BY MR. DU MAURIER.

London: SMITH, ELDER, AND CO., 15, Waterloo Place.

London: The Educational Magazine Publishing Company, Limited, Pilgrim St., Ludgate Hill, E.C.

HAZELL, WATSON, AND VINEY, LIMITED.]

[All Rights Reserved.]

[LONDON AND AYLESBURY.

NOW READY. 'THE PRACTICAL TEACHER,' Volume IV. Beautifully Bound. Price 10s. 6d.; sent carriage paid for P.O.O. 7s. 6d. Early application should be made, as only a few Copies are left.

NOW READY, No. 5, Vol. IV., of 'THE SCHOLAR,' for March, price 6d.; per post 12 Copies with Answer Card, for 6½d. It contains: Robinson Crusoe (Illustrated), Up the Rhine, Ho-Ho of the Golden Belt, Arithmetic with Answers for Standards III., IV., V., VI., and VII., Dictionary of Difficult Words with their Meanings, and original School Song, entitled 'Mother's Fire.'

price 1s. each.

NEW & RECENT PUBLICATIONS.

SERIES NOW COMPLETE. SPECIMEN PAGES FREE.

PHILIPS' GEOGRAPHICAL READERS.

ADOPTED BY THE LONDON SCHOOL BOARD.

1. **FIRST STEPS.** PART I., explaining 'Plans of School and Playground, the Cardinal Points, and meaning and use of a Map.' With Word-Lists and Summaries, 45 Lessons, 112 Illustrations and Maps. 128 pp., cloth, price 9d.

2. **FIRST STEPS.** PART II. 'The Size and Shape of the World, Geographical Terms simply explained and illustrated by reference to the Map of England, and Physical Geography of Hills and Rivers.' 47 Lessons and 100 Illustrations, Diagrams, and Maps. 140 pp., cloth, price 10d.

3. **ENGLAND.** Physical and Political, giving in a graphic Narrative form the 'Physical and Political Geography of England.' With 60 Lessons, 78 Illustrations, and 57 Maps, 192 pp., cloth, price 1s.

4. **BRITISH ISLES, BRITISH N. AMERICA,** AND AUSTRALIA, described in a series of well-written Sketches of Voyages, Travels, etc. 81 Lessons, 54 Maps, and 109 Illustrations. 256 pp., cloth, price 1s. 6d.

5. **EUROPE,** Physical and Political, described in a series of Narratives of Voyages and Tours. With Appendix—Latitude and Longitude: Day and Night, The Seasons, 66 Lessons, 119 Illustrations, and 19 Maps. 288 pp., cloth, 1s. 9d.

6. **THE WORLD.** A Series of Voyages and Travels in Asia, Africa, America, and Polynesia. With Appendix—Interchange of Productions: Circumstances which determine Climate. 87 Lessons, 116 Illustrations, and 35 Maps. 320 pp., cloth, price 2s.

***** These Readers contain no less than 800 fine Woodcuts and specially prepared Maps and Diagrams. No labour or expense has been spared to make the Series the best yet published.**

'All the books are crowded with good illustrations, maps, portraits, and sketches; the type is large and clear. They are altogether a decided step in advance in geographies for elementary schools under Government inspection.'—*School Board Chronicle.*

PHILIPS' STANDARD ATLASES.

STANDARD ATLAS, No. 1, for STANDARD III. **12** finely-coloured Maps, price 2d
STANDARD ATLAS, No. 2, for STANDARD IV. **44** finely-coloured Maps, price 4d.
STANDARD ATLAS, No. 3, for STANDARD V. **35** finely-coloured Maps, price 4d.
STANDARD ATLAS, No. 4, for STANDARD VI. **31** finely-coloured Maps, price 4d.

The only Standard Atlases in which the Maps are distinctly legible and really copyable.

******* *The finest Atlases for School use ever produced. Adopted by the London School Board.*

STANDARD MENTAL ARITHMETIC.

Specially prepared to meet the requirements of the MUNDELLA CODE, by T. W. PIPER. In SIX BOOKS—Standards I. to VI. Fcap. 8vo, stiff covers, 1d. each.

TEACHERS' BOOK OF RULES, ANSWERS, NOTES AND HINTS FOR SOLUTIONS to the same. Fcap. 8vo. Standards II. to VI., each 3d.; Standard I., PROBLEMS AND ANSWERS only, 2d.

With these books the largest classes can be at once set to work simultaneously, and the results instantly verified. Adopted by the London School Board.

Recently Published, in neat Cloth Case, price 1s. each Standard.

THE 'CAXTON' GRAMMATICAL TEST CARDS.
THE 'CAXTON' ARITHMETICAL TEST CARDS.

For Standards II. to VII., 36 Cards for each Standard. Specially prepared for the New Code, by DAVID BAIN, F.R.G.S. St. John's College, Cambridge.

These 'Test Cards' are got up in a very superior manner, and are highly commended by experienced Teachers. They are undoubtedly the best Cards for Elementary School work, and must produce good results.

Just Published, crown 8vo, cloth, 1s.

PRACTICAL HINTS ON ELEMENTARY SCHOOL WORK.

BY AN EXPERIENCED EXAMINER.

Indispensable to every Teacher desiring to secure high results on the Examination Day.

Specimen Copy post free on receipt of the published price.

PHILIPS' HISTORICAL READERS.

New Editions, exactly adapted to the requirements of the present Code.

1. **STORIES FROM ENGLISH HISTORY.** 60 Lessons with Notes, 80 beautiful Pictures, and 4 Maps. Cloth, 1s.

These 'Stories from English History' form one of the brightest and most attractive reading-books ever published.

2. **EARLY ENGLAND,** from Pre-historic Times to 1154. 63 Lessons with Notes, 94 attractive Pictures, and 6 Maps. Cloth, 1s.

In this beautifully illustrated and well-written little book, the story of the making and founding of our nation is graphically sketched. The opening section contains vivid pen and pencil pictures of life in this country in Pre-historic times—the periods of the men of the caves, the stone-hatchet men, the bronze-workers, etc.

3. **MIDDLE ENGLAND,** from 1154 to 1603. 61 Lessons with Notes, 77 Beautiful Pictures, and 16 Maps and Tables. Cloth, 1s. 6d.

In this book the history of our country is continued from the reign of Henry II. when the welding of Saxons and Normans into one compact people commenced, to the end of the reign of Elizabeth, when the modern, social, political, and scientific ideas had at least been fully thought out.

4. **MODERN ENGLAND,** from 1603 to 1883. 64 Lessons with Notes, 93 attractive Pictures, and 11 Maps and Tables. Cloth, 1s. 6d.

In this book the great events of the last 280 years are graphically and succinctly described and fully illustrated.

******* *The superiority of these Readers is fully proved by the fact that their introduction is invariably followed by the best results, and that they are best liked by the best Teachers.*

LONDON: GEORGE PHILIP & SON, 32, FLEET STREET
Liverpool: Caxton Buildings, and 49 and 51, South Castle Street.

NEW CODE READING BOOKS

PUBLISHED BY

THE NATIONAL SOCIETY.

All these Reading Books are exactly adapted to the New Code of 1884, *and the English History and Geography Reading Books have just been subjected to a thorough revision.*

NEW AND REVISED EDITION.

Miss Yonge's English History Reading Book for Standard II. 84 pp., 40 Lessons, 9d.
Miss Yonge's English History Reading Book for Standard III. 128 pp., 60 Lessons, 1s. 0d.
Miss Yonge's English History Reading Book for Standard IV. 156 pp., 61 Lessons, 1s. 3d.
Miss Yonge's English History Reading Book for Standard V. 196 pp., 60 Lessons, 1s. 8d.
Miss Yonge's English History Reading Book for Standard VI. 224 pp., 60 Lessons, 1s. 8d.
The Young Student's English History Reading Book (Advanced). 256 pp., 60 Lessons, 2s.

The *Athenæum* says:—'The National Society are to be greatly complimented on the way in which they and the talented author whose services they have enlisted have carried out a very useful work.'

The *Schoolmaster* says:—'The work is well done.'

The *School Board Chronicle* says:—'Well written, picturesque, and interesting.'

The *Ecclesiastical Gazette* says:—'The best *elementary* History of England with which we are acquainted.'

NEW AND REVISED EDITION.

Geography Reading Book for Standard I. ... ... 80 pp., 40 Lessons ... 8d.
Geography Reading Book for Standard II. ... ... 100 pp., 40 Lessons ... 10d.
Geography Reading Book for Standard III. ... ... 156 pp., 60 Lessons ... 1s. 4d.
Geography Reading Book for Standard IV. ... ... 196 pp., 60 Lessons ... 1s. 8d.
Geography Reading Book for Standard V. ... ... 208 pp., 60 Lessons ... 1s. 9d.
Geography Reading Book for Standard VI. ... ... 224 pp., 60 Lessons ... 2s. 0d.

The *Schoolmaster* says:—'The whole series has been carefully prepared on a rational and practical basis.'

The *Saturday Review* says:—'The author has certainly succeeded in giving the first lessons in geography in a form that is at once simple and attractive.'

The *Literary Churchman* says:—'The new series of Geography Reading Books leaves nothing to be desired, as the chapters are interesting and correct, and the illustrations good.'

New National Reading Books—Infant Primer ... ... 32 pp. ... ... 2½d.
New National Reading Books—Infant Reader ... ... 64 pp. ... ... 4d.
New National Reading Books—Standard I. ... ... 112 pp. ... ... 6d.
New National Reading Books—Standard II. ... ... 128 pp. ... ... 9d.
New National Reading Books—Standard III. ... ... 192 pp. ... ... 1s. 0d.
New National Reading Books—Standard IV. ... ... 288 pp. ... ... 1s. 6d.
New National Reading Books—Standards V. and VI. ... 352 pp. ... ... 2s. 0d.

The *Athenæum* says:—'Marked by a certain amount of literary excellence, which renders them worthy specimens of our language.'

The *School Board Chronicle* says:—'Compiled with high intelligence, and a thorough knowledge of the work of the schoolroom.'

The *Schoolmaster* says:—'Carefully graduated, boldly printed, and amply illustrated.'

NATIONAL SOCIETY'S DEPOSITORY, SANCTUARY, WESTMINSTER, S.W.

PROSPECTUS

OF THE NEW VOL., BEING VOL VI. OF

☞ The First Number of the New Vol. will be ready on FEB. 25th, 1886.

1. **HOW TO PREVENT DISEASE IN** SCHOOL AND HOME. By Dr. ALFRED CARPENTER. Specially designed to meet the additional requirements for Certificate Examinations.

2. **ANIMAL PHYSIOLOGY for STUDENTS,** (Science and Art.) By Dr. ARTHUR NEWHOLME. (By request.)

3. **ELEMENTS OF MENTAL AND MORAL** SCIENCE AS APPLIED TO TEACHING. By J. ADAMS, M.A., Lecturer on School Method at the Aberdeen Free Church Training College. Invaluable to Students in Training and Acting Teachers.

4. **HOW TO EARN THE EXCELLENT** MERIT GRANT. By one of Her Majesty's Inspectors of Schools.

5. **KINDER-GARTEN AND VARIED OCCU-** PATIONS FOR INFANTS. By Miss J. W. WARREN, Inspectress of Infant Schools to the Leicester School Board. Author of Hughes's 'Giant Letter and Word Series.'

6. **A MODEL TECHNICAL SCHOOL, WITH** AN ACCOUNT OF THE METHODS EMPLOYED THEREIN.

7. **EASY STEPS IN TRIGONOMETRY** for Senior Pupil Teachers, Students in Training, and Acting Teachers. By Rev. A. D. CAPEL, M.A., Author of 'Common-Sense Euclid,' 'Catch Questions in Arithmetic and Mensuration.'

8. **HOW TO TEACH THE BABIES.** (With Illustrations.) By JAMES BAILEY, Esq., Head Master, Southlands Training College.

9. **HOW I TEACH DOMESTIC ECONOMY.** By Mrs. WIGLEY, Lecturer on Method at the Cheltenham Training College.

10. **GRAPHIC NOTES OF LESSONS.** (With Illustrations.) By JOS. H. COWHAM, F.G.S., Lecturer on School Method at the Westminster Training College. Author of 'Cowham's Mulhallser's Copy Books.' Designed for Upper Standards, P.T. Course, Students, and Physiography Examples.

11. **CHEAP DAINTY DISHES AND HOW** TO COOK THEM. Being Practical Lessons for Girls.

12. **SHAKESPEARE'S KING LEAR.** (Copiously annotated.) Indispensable to Students and Acting Teachers. By H. M. HEWITT, M.A., LL.M., etc., etc.

13. **HINTS TO PUPIL TEACHERS ON** STUDYING, WITH SPECIMEN EXAMINATION PAPERS. Prizes to be given for best answers. By C. J. DAWSON, B.A., Ex-President of the National Union of Elementary Teachers.

14. **MODEL ANSWERS to P.T. QUESTIONS.**

15. **MODEL ANSWERS TO MATRICULA-** TION QUESTIONS.

16. **MODEL ANSWERS TO SCHOLARSHIP** QUESTIONS. (Male and Female.)

17. **MODEL ANSWERS TO 2nd YEAR'S** CERTIFICATE QUESTIONS. (Male and Female.)

18. **POPULAR MYTHOLOGY.** By Rev. Sir GEO. W. COX, Bart., M.A.

19. **TWELVE OR TEN SCHOOL SONGS.** Original. In Both Notations. By various authors.

20. **INSPECTORS' STANDARD EXAMINA-** TION QUESTIONS. With Model Answers to Every Question in Every Subject.

21. **SCIENCE GOSSIP.**

22. **HOW TO PASS THE SCHOLARSHIP** EXAMINATION. With Hints, what Books to Read, etc., etc.

REVIEWS. QUERY COLUMN.
MONTHLY RECORD. COMING EXAMINATIONS.
PRIZE COMPETITIONS. SCHOOL ENTERTAINMENTS,
PUBLICATIONS RECEIVED. AND HOW TO GET THEM UP.

PUBLISHING OFFICES:-

PILGRIM ST., LUDGATE HILL, LONDON, E.C.

MR. MURRAY'S LIST OF SCHOOL BOOKS.

HISTORIES.

Crown 8vo. 7s. 6d. each.

The Student's Hume. *Thoroughly Revised Edition*, continued to the TREATY OF BERLIN, 1878. By the late Prof. J. S. BREWER. 7 Coloured Maps and 70 Woodcuts (830 pp.)

*** Also published in Three Parts, 2s. 6d. each. PART I.—B.C. 55-A.D. 1485. PART II.—A.D. 1485-1688. PART III.—1688-1878.

Students' Modern Europe. FROM the Fall of Constantinople to the Treaty of Berlin. By RICHARD LODGE, M.A. *(A New Volume, just out.)*

Students' History of Europe during the Middle Ages. By HENRY HALLAM.

Students' Hallam's Constitutional History of Eng. Hen. VII.—Geo. II.

Students' Old Testament History. By P. SMITH. With Maps and Woodcuts.

Students' New Test. History. By PHILIP SMITH. With Maps and Woodcuts.

Students' Ancient History. To the Conquests of Alexander the Great. By PHILIP SMITH. With Woodcuts.

Students' Ecclesiastical History. 2 Vols.: I. A.D. 30-1003. II. 1003-1614. By PHILIP SMITH. With Woodcuts. 7s. 6d. each.

Students' English Church History. 2 Vols.: I. 596-1509. II. 1509-1717. By CANON PERRY. 3s. 6d. each.

Students' History of Greece. To the Roman Conquest. By Dr. WM. SMITH. With Coloured Maps and Woodcuts.

Students' History of Rome. To the Establishment of the Empire. By DEAN LIDDELL. With Coloured Map and Woodcuts.

Students' Gibbon. With Notes and Woodcuts.

Students' History of France. By W. H. JERVIS. Coloured Maps and Woodcuts.

DR. WM. SMITH'S SERIES OF

SMALLER HISTORIES.

Scripture History of the Old and New Testaments. 40 Woodcuts. 3s. 6d.

Ancient History of the East. 70 Woodcuts. 12mo. 3s. 6d.

Greece. To the Roman Conquest. Coloured Maps and 74 Woodcuts. 3s. 6d.

Rome. To the Time of the Empire. Coloured Map and Woodcuts. 3s. 6d.

Classical Mythology. With Questions. 90 Woodcuts. 3s. 6d.

England. To the Year 1878. Coloured Maps and 68 Woodcuts. 16mo. 3s. 6d.

FOR ELEMENTARY SCHOOLS.

A Primary History of Britain. (368 pp.) 12mo. 2s. 6d.

Markham's History of England. Down to the year 1878. 100 Woodcuts. 3s. 6d.

Markham's History of France. Down to 1878. 70 Woodcuts. 3s. 6d.

Markham's History of Germany. Down to 1880. With 50 Woodcuts. 3s. 6d.

Little Arthur's History of England. Down to 1878. 36 Woodcuts. 1s. 6d.

Little Arthur's History of France. To the Fall of the Second Empire. Maps and Woodcuts. 2s. 6d.

LITERATURE, &c.

Students' English Language Its Origin and Growth. By G. P. MARSH. 7s. 6d.

Students' English Literature. With Biographical Notices. By T. B. SHAW. 7s. 6d.

Students' Specimens of English Literature. 7s. 6d.

Smaller History of English Literature. 16mo. 3s. 6d.

Smaller Specimens of English Literature. With Notes. 16mo. 3s. 6d.

Students' Moral Philosophy. By Dr. FLEMING. 7s. 6d.

DR. WM. SMITH'S

EDUCATIONAL SERIES.

LATIN COURSE.

Young Beginners' 1st Latin Book: an Introduction to Principia Latina, Part I. 2s.

Young Beginners' 2nd Latin Book: an Introduction to Principia Latina, Part II. 2s.

Principia Latina. Part I. Grammar, Exercises, Vocabularies, etc. 3s. 6d.

Appendix to Part I. Exercises and Examination Papers. 2s. 6d.

Principia Latina. Part II. First Reading Book. 3s. 6d.

Principia Latina. Part III. First Verse Book. 3s. 6d.

Principia Latina. Part IV. Prose Composition. 3s. 6d.

Principia Latina. Part V. Prose Translation. 3s.

Students' Latin Grammar. 6s.

Smaller Latin Grammar. 3s. 6d.

Latin-English Vocabulary to Phædrus, Corn. Nepos, and Cæsar. 3s. 6d.

A Child's First Latin Book. Nouns Pronouns, and Adjectives, with the Active Verbs. By T. D. HALL. 16mo. 2s.

Tacitus. The Germania, Agricola, and Annals, Book 1. With Notes. 16mo. 3s. 6d.

GREEK COURSE.

Initia Græca. Part I. Grammar, Exercises, Vocabularies, etc. 3s. 6d.

Appendix to Part I. Exercises and Examination Papers. 2s. 6d.

Initia Græca. Part II. Reading Book. 3s. 6d.

Initia Græca. Part III. Prose Composition. 3s. 6d.

Students' Greek Grammar. 6s.

Smaller Greek Grammar. 3s. 3d.

Greek Accidence. 2s. 6d.

Plato. Selections. With Notes. 3s. 6d.

ENGLISH COURSE.

English Grammar. With Exercises. 3s. 6d.

Primary English Grammar. With Exercises, etc. 1s.

English Composition. With Illustrations and Exercises. 3s. 6d.

FRENCH COURSE.

French Principia. Part I. Grammar, Exercises, Vocabularies, etc., with Materials for Conversation. 3s. 6d.

Appendix to Part I. Exercises and Examination Papers. 2s. 6d.

French Principia. Part II. A Reading Book, with Dictionary. 4s. 6d.

Students' French Grammar. 6s.

Smaller French Grammar. 3s. 6d.

GERMAN COURSE.

German Principia. Part I. Grammar, Exercises, Vocabularies, etc., with Materials for Conversation. 3s. 6d.

German Principia. Part II. A Reading Book: with a Dictionary. 3s. 6d.

Practical German Gram. 3s. 6d.

ITALIAN COURSE.

Italian Principia. Part I. Grammar, Exercises, Vocabularies, etc., with Materials for Conversation. 3s. 6d.

Italian Principia. Part II. Reading Book. 3s. 6d.

ETON COLLEGE BOOKS.

The Eton Latin Grammar. Part I.—ELEMENTARY. By A. C. AINGER, M.A., and H. G. WINTLE, M.A.

Also, by the same Editors,

A First Latin Exercise Book. Adapted to the above Grammar.

The Eton Fourth Form Ovid. With Notes by H. G. WINTLE. 2s. 6d.

Manuals and Text Books of Geography.

'I feel strongly the great importance of the subject, not only as a mental discipline and essential part of a liberal education, but as more especially necessary for Englishmen, many of whom will be called upon in after life to turn their geographical knowledge to practical and serious account.'—*One of the opinions of Head Masters of English Public Schools*, in the Report of THE R.G.S. on Geographical Education, 1885.

The Student's Manual of Modern Geography, Mathematical, Physical, and Descriptive. By CANON W. L. BEVAN, M.A. *New and Revised Edition.* With 150 Maps and Woodcuts. Post 8vo. 7s. 6d.

A School Manual of Modern Geography. By J. RICHARDSON (400 pp.). Post 8vo, 5s.

'After a careful examination we are bound to say that it is the most comprehensive, accurate, and methodical geography with which we are familiar, and bears on every page unmistakable traces of careful and industrious research. It fully sustains the high reputation of Mr. Murray's series of manuals, and we venture to predict for it a wide popularity. Bearing in mind its high character, it is a model of cheapness.'—*School Guardian.*

A Smaller Manual of Modern Geography. By J. RICHARDSON. 16mo, 2s. 6d.

'We frankly acknowledge that we have never seen anything of its kind, and for its space, at all approaching to this Smaller Geography.'—*English Churchman.*

The Student's Manual of Ancient Geography. By CANON W. L. BEVAN, M.A. With 240 Maps and Woodcuts. Post 8vo, 7s. 6d.

A Smaller Manual of Ancient Geography. By CANON BEVAN. With 32 Woodcuts. (240 pp.) 16mo, 3s. 6d.

'A valuable addition to our geographical works. It contains the newest and most reliable information derived from the researches of modern travellers. No better text-book can be placed in the hands of scholars.'—*Journal of Education.*

Physical Geography. By MARY SOMERVILLE. Revised by JOHN RICHARDSON. (548 pp.) 9s.

'Such manuals as those of . . Mrs. Somerville leave little to be desired.'—MR. J. S. KELTIE'S *Report on Geographical Education.*

DR. WM. SMITH'S

SCHOOL DICTIONARIES.

A Smaller Latin-English Dictionary. With a Dictionary of Proper Names. *A New Edition. Thoroughly Revised and Partly Re-written.* By Dr. W. SMITH and Prof. HALL, M.A. Square 12mo, 7s. 6d.

A Smaller English-Latin Dictionary. Square 12mo. 7s. 6d.

A Complete Latin-English Dictionary. With the Calendar, Measures, Weights, Moneys, etc. 8vo, 21s.

A Copious and Critical English-Latin Dictionary. Medium 8vo, 21s.

A Concise Dictionary of the Bible. With Illustrations. Medium 8vo, 21s.

A Smaller Bible Dictionary. With Illustrations. Crown 8vo. 7s. 6d.

A Classical Dictionary of Greek and Roman Mythology, Biography, and Geography. With 750 Woodcuts. 8vo. 18s.

A Smaller Classical Dictionary. With 200 Woodcuts. Crown 8vo. 7s. 6d.

A Smaller Dictionary of Antiquities. 200 Woodcuts. Crown 8vo. 7s. 6d.

Standard School Books.

A Short Hebrew Grammar. By Prof. STANLEY LEATHES. 7s. 6d.

Newth's First Book of Natural Philosophy. 3s. 6d.

Oxenham's English Notes for Latin Elegiacs. 3s. 6d.

Hutton's Principia Græca. Grammar, Delectus, Exercises, Vocabularies. 3s. 6d.

Lyell's Student's Elements of Geology. *New Edition, thoroughly Revised.* By Prof. P. M. DUNCAN. 9s.

Practical Dictionary of the English, French, and German Languages. 6s.

*** DETAILED CATALOGUE SENT GRATIS BY POST ON APPLICATION.

JOHN MURRAY ALBEMARLE STREET.

THE ROYAL SCHOOL SERIES

PREPARED EXPRESSLY for the PRESENT CODE.

'PAYMENTS BY RESULTS.'—The Teachers who use the ROYAL SCHOOL SERIES often obtain 100 *PER CENTUM OF PASSES.*

NEW ROYAL INFANT SERIES

NOW READY.

THE LITTLE PRIMER. 32 pp., price 1d.; cloth, 2d.

THE LITTLE READER, Part I. 64 pp., price 2d.; cloth, 3d.

THE LITTLE READER, Part II. 64 pp., price 2d.; cloth, 3d.

ROYAL WALL SHEETS to suit the 'LITTLE PRIMER,' printed on tough parchment paper, price 10s. per Set

SIZE of each sheet, 30 *inches by* 41. *Type very large, bold, and clear.*

These New Books form a Complete Course for INFANT SCHOOLS, and will be found to supply all that is required till the Scholars pass into Standard I. They have been prepared with very special care. They are beautifully illustrated. Teachers will find them in Plan and in Matter superior to any Infant Class Books ever published. They place the ROYAL SCHOOL READER SERIES still more strikingly in advance of all existing publications.

THE NEW ROYAL READERS.

Being Revised Editions of these favourite Readers, with New Lessons, New Illustrations, and Important Helps to Teachers, making this Series the best for Teachers and Scholars ever published.

STANDARD I.	Limp, 7d.; cloth boards, 9d.	STANDARD IV.	Limp, 1s.; cloth boards, 1s. 3d.
STANDARD II.	Limp, 7d.; cloth boards, 9d.	STANDARD V.	Cloth boards, 1s. 6d.
STANDARD III.	Limp, 10d.; cloth boards, 1s.	STANDARD VI.	Cloth boards, 1s. 6d.

HOME-LESSON BOOKS *for the Series, Nos.* 1 *to* 4, *price* 2*d.; Nos.* 5 *and* 6, *price* 3*d. each.*

'The editors and publishers have, apparently, vied with each other to produce a series of Readers of exceptional merit. Everything has been admirably done. New lessons, carefully graduated; new illustrations of rare artistic and educational value; faultless models of writing copies (white on black ground); and a series of "helps," adequate enough to satisfy the most fastidious teacher or the dullest scholar, all combine to stamp these Readers as amongst the very best yet issued. Happy the child who treads this "New" royal road to learning.'

PRACTICAL TEACHER.

A NEW SERIES OF GEOGRAPHICAL READERS.

THE WORLD AT HOME.

With Beautiful Illustrations, Maps, and Diagrams.

No. 1 for Standard I.—PLANS, MAPS, and the COMPASS. Meaning and Use of a Map. 112 pages. Price 7d.

No. 2 for Standard II.—GEOGRAPHICAL TERMS Explained and Illustrated by reference to the Map of England. Physical Geography of Hills and Rivers. 128 pages. Price 9d.

No. 3 for Standard III.—ENGLAND & WALES: Physical and Political Geography. With numerous Maps and Illustrations. 160 pages. Price 1s.

No. 4 for Standard IV.—BRITISH ISLANDS, BRITISH NORTH AMERICA, and AUSTRALASIA, with Knowledge of their Productions. With numerous Maps and Illustrations. 240 pages. Price 1s. 6d.

No. 5 for Standard V.—EUROPE: Physical and Political. Latitude and Longitude; Day and Night; The Seasons. Maps and Illustrations. 256 pages. Price 1s. 6d.

No. 6 for Standard VI.—THE WORLD. The Geography of the World Generally, and especially of the British Colonies and Dependencies. Interchange of Productions, etc. With numerous Maps and Illustrations. 272 pages. Price 1s. 6d.

HOME-LESSON AND MAP BOOKS *to No.* 1, 1*d.; No.* 2, 1*d.; No.* 3, 2*d.; No.* 4, 2*d.; No.* 5, 2*d.; No.* 6, 2*d.*

ROYAL HISTORY READERS.

With Sketch Maps, Notes, Vocabularies, List of Dates, and numerous Illustrations.

THE ROYAL STORY BOOK OF ENGLISH HISTORY. 192 pages. Fcap. 8vo, cloth boards, price 1s. *For Standard III.*

This Book contains 60 Lessons and 120 pages of reading matter, exclusive of all Exercises, Illustrations, and Spelling Lists.

HOME-LESSON BOOK. Price 2d.

THE PRIMARY HISTORY OF ENGLAND. With Questions, Spelling Exercises, etc. 224 pages. Fcap. 8vo, cloth boards, price 1s. 3d. *For Standard IV.*

This Book is an enlarged edition of the '*Simple History of England.*' It contains 64 Lessons and 144 pages of reading matter, exclusive of all Exercises, Illustrations, and Spelling Lists.

HOME-LESSON BOOK. Price 3d.

THE INTERMEDIATE HISTORY OF ENGLAND. A Complete History for Standard V. 256 pages. Post 8vo, cloth, price 1s. 6d. *For Standard V.*

This Book is a revised edition of '*Pictures of English History.*' It contains 60 Lessons and 176 pages of reading matter, exclusive of all Exercises Illustrations, and Spelling Lists.

HOME-LESSON BOOK. Price 3d.

THE ADVANCED HISTORY OF ENGLAND. A Detailed History, arranged in Periods, Reigns, and Reading Lessons. With Maps, Notes, and Vocabularies, Lists of Dates, and Genealogical Trees. 320 pages. Cloth, price 2s. *For Standards VI. and VII.*

HOME-LESSON BOOK. Price 3d.

POCKET DATE BOOKS. English History, 1d.; Scottish History, 1d.

☞ A Specimen free to Head Teachers of Public Elementary Schools.

THOMAS NELSON & SONS, 35 & 36, Paternoster Row, London, E.C.; Parkside, Edinburgh; and New York.